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PATENTS FOR INVENTIONS.

ABRIDGMENTS

OF

Specifications

RELATING TO

FIRE-ARMS AND OTHER WEAPONS,
AMMUNITION, AND ACCOUTREMENTS.

PART II.—A.D. 1858-1866.

PRINTED BY ORDER OF THE COMMISSIONERS OF PATENTS.



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P R E F A C E.

THE Indexes to Patents are now so numerous and costly as to render their purchase inconvenient to a large number of inventors and others, to whom they have become indispensable.

To obviate this difficulty, short abstracts or abridgments of the Specifications of Patents under each head of invention have been prepared for publication separately, and so arranged as to form at once a Chronological, Alphabetical, Subject-matter, and Reference Index to the class to which they relate. As these publications do not supersede the necessity for consulting the Specifications, the prices at which the printed copies of the latter are sold have been added.

The number of Specifications from the earliest period to the end of the year 1866 amounts to 59,222. A large proportion of the Specifications enrolled under the old law, previous to 1852, embrace several distinct inventions, and many of those filed under the new law of 1852 indicate various applications of the single invention to which the Patent is limited. Considering, therefore, the large number of inventions and applications of inventions to be separately dealt with, it cannot be doubted that several properly belonging to the group which forms the subject of this volume have been overlooked. In the progress of the whole work such omissions will, from time to time, become apparent, and be supplied in second or supplemental editions.

This volume is a continuation of the "Abridgments" of the Specifications relating to Fire-arms and other "Weapons, Ammunition, and Accoutrements," already published, and brings the Abridgments to the end of the year 1866. From that date the Abridgments have not been published in classes, but will be found in chronological order in the quarterly volumes of the "Chronological and Descriptive Index" (see List of Works at the end of this book). It is intended, however, to publish these Abridgments in classes as soon as the Abridgments of all the Specifications from the earliest period to the end of 1866 have appeared in a classified form. Until that takes place, the reader (by the aid of the Subject-matter Index for each year) can continue his examination of the Abridgments relating to the subject of his search in the Chronological and Descriptive Index.

The Abridgments marked thus (* *) in the following pages were prepared for another series or class, and have been transferred therefrom to this volume.

B. WOODCROFT.

August, 1870.

INDEX OF NAMES.

[The names printed in *Italic* are those of the persons by whom the inventions have been communicated to the Applicants for Letters Patent.]

	Page		Page
Abbott, E.....	56	Austin, W.....	259
<i>Abeilhou, J. L.</i>	228	Ayerst, T. R.....	33
Abrahams, J.	519		
Adams, A. J.	235	Baddeley, J. F. L.....	160
—, J.	169, 513	Baggett, F.....	204
—, R.....	77, 329	Bailey, J. W.....	264
Ager, W.....	476, 510	—, T.....	9, 26, 153
Agnew, W.....	301	Baillie, B.....	121
Aisthorpe, J.....	340	Bainbridge, P.....	363
Albini, A.....	262, 527, 536	Baker, F. T.....	478
Alderson, H. J.	490	—, J.....	166
Aldred, J.....	363	—, V.....	104, 287, 317
Alexander, A.....	369	—, W.....	203
<i>Alger, C. C.</i>	164, 300	Balchin, E.....	29
<i>Allen, C. B.</i>	45	<i>Ball, A.</i>	464.
Allman, H.....	437	Ballyhigue, B. A. A. de C.	
<i>Alsop, C. R.</i>	167	de.....	512
—, J. W.	167	Barber, H.....	563
Ambler, H.....	38, 54	—, T. W.....	523
Ames, H.....	406, 474	—, W.....	523
<i>Ames, J. T.</i>	485	Bardell, W. P.....	529
Anderson, Sir J. C.	562	Bark, C.....	80
Ansell, W.....	407	Barnes, J. B.....	143
Arbuckle, G. B. V.....	147	Barnsley, J.....	402
Arman, T. E.....	184	Barnwell, S.....	121
Armbruster, C.....	362	Barrett, S.....	160, 220
Armour, J.....	66	Barrow, H.....	17
Armstrong, Sir W. G.....	24, 36, 38, 150, 189	Bartram, W.....	194, 412
Arnold, D.....	424	Bate, G.....	97
Ashby, J. E.....	47	Bates, B. F.....	269
Askham, J. N.....	129	Batson, J.....	197
Aston, C. P.....	8	<i>Baxter, De W. C.</i>	394
—, J.....	469	Bayliss, B.....	75
Atkinson, J.....	53	—, H.....	481
Aubin, W. H.....	417	—, O.....	186
		—, S.....	507

	Page		Page
<i>Beardslee, F. E.</i>	265	<i>Bodmer, L. R.</i>	195
—, <i>G. W.</i>	265	<i>Bolton, F. J.</i>	206
<i>Beasley, J. B.</i>	16	—, <i>G. N.</i>	384
<i>Beaumont, W.</i>	213	<i>Bond, J.</i>	224
<i>Beley, G. P.</i>	275	<i>Bonneton, G. Prodon.</i>	190
<i>Bell, F. H.</i>	39	<i>Bonneville, H. A.</i>	291, 332,
<i>Bell, G.</i>	395	445, 497, 512	
<i>Bell, W. H.</i>	33	<i>Borrows, E.</i>	352
<i>Bennett, W. A. B.</i>	9	<i>Bossard, P. J.</i>	249
<i>Bennetts, W.</i>	194	<i>Bouch, T.</i>	254
<i>Benson, J. S.</i>	553	<i>Boucher, J.</i>	215
—, <i>W.</i>	62	<i>Bourke, J.</i>	240
<i>Bentley, D.</i>	117	<i>Bourne, J. F.</i>	171
—, <i>J.</i>	63, 117	<i>Bousfield, G. T.</i>	179, 259, 271,
—, <i>T.</i>	150	308, 316, 325, 346, 347, 407,	
<i>Benton, M. F.</i>	260	428, 494	
<i>Berdan, H.</i>	400, 452, 481, 548	<i>Bowley, K. T.</i>	81
<i>Bergen, A. J.</i>	517	<i>Boxer, E. M.</i>	318, 362, 475,
<i>Berger, C.</i>	269	536	
<i>Berney, T.</i>	533	<i>Boyle, S. J.</i>	504
<i>Berwick, Rt. Hon. R., Lord</i> 101		<i>Braam, J. A. van.</i>	165
<i>Bessemer, H.</i>	139, 158, 334	<i>Bradley, C. H.</i>	205
<i>Bickford, J. S.</i>	285, 427	<i>Braindin, F. A.</i>	301, 421, 527,
<i>Biddell, G. A.</i>	78	536	
—, <i>W.</i>	184	<i>Bradbury, W.</i>	115, 126
<i>Bielefield, C. F.</i>	88	<i>Braham, J.</i>	143
<i>Bigorie, A. G.</i>	435	<i>Brandon, R.</i>	413
<i>Billinghurst, W.</i>	264	<i>Braun, A.</i>	502
<i>Birchley, E.</i>	20	<i>Braynard, T. L.</i>	110
<i>Bird, J. N.</i>	245	<i>Brazier, R.</i>	8, 336
<i>Biron, C. J.</i>	445	<i>Brierley, W.</i>	231
<i>Bissell, T.</i>	274, 436	<i>Brighton, W.</i>	307
—, <i>T. L.</i>	280	<i>Brindley, T. F. R.</i>	226
<i>Bisset, J.</i>	228	<i>Britten, B.</i>	87, 147, 369
<i>Blackie, J.</i>	431	<i>Broadhead, H.</i>	290
<i>Blackwood, Sir F.</i>	403	<i>Broadhurst, H.</i>	387
<i>Blake, J.</i>	110	<i>Broadwell, L. W.</i>	170, 284
<i>Blakely, T. A.</i>	263, 268, 285,	<i>Broadwell, L. W.</i>	430
320, 321, 323, 396, 475		<i>Brockedon, W.</i>	558
<i>Blakely, T. A.</i>	358	<i>Brooks, E.</i>	77, 154, 188, 288, 522
<i>Blakeslee, E.</i>	410	<i>Brooman, C. E.</i>	490, 530
<i>Blanc, A.</i>	218	—, <i>R. A.</i>	28, 39, 42, 67,
<i>Blanchon, F. A.</i>	309, 511	110, 130, 134, 170, 191, 246,	
<i>Bland, J. F.</i>	227, 330, 331	253, 284, 288, 291, 299, 358,	
<i>Bleckmann, J. H. A.</i>	500	368, 379, 404, 420, 421, 430,	
<i>Bloxam, H.</i>	186	435	
<i>Bobœuf, P. A. F.</i>	561	<i>Brown, C. F.</i>	100
<i>Boccius, G.</i>	74	—, <i>D.</i>	255

INDEX OF NAMES.

vii

	Page		Page
Brown, H.....	11	Cate, G.....	314, 390
—, J.....	107, 448, 453	Caudwell, H.....	345
—, J. H.....	18, 64, 158, 565	Chabot, C.....	459
—, R.....	35	Challeton, J. F. F.....	98
—, T.....	349	Chalmers, J.....	318
—, W.....	255	Chapman, C.....	537
Brown, W. J. E.....	376	Charlesworth, E.....	44
Browne, B.....	223, 307	Chassepot, A. A.....	530
Browning, W.....	159	Chattaway, C.....	460
Brownlow, H. M.....	213	Chatterton, J.....	71
Bryant, J. D.....	327	Chaumont, P. J. Lejeune.....	61
Bryse, J.....	193	Chauncey, H.....	167
Buckland, C.....	259	Chesebrough, R. A.....	349
Buckley, J.....	115, 126	Chesebrough, R. A.....	424
Budd, L.....	202	Chester, J. L.....	15, 17
Budenburg, A.....	311, 469	Chesterman, J.....	186
—, C. F.....	311, 469	Chevalier, C.....	86
Burbanks, S. T.....	142	Cheyne, C.....	167
Burchall, J.....	352	Chinnock, C.....	559
Burke, J.....	502	Christofleau, L.....	276
Burley, R.....	227	Christoph, L.....	182, 260
Burnard, J.....	178	Church, W.....	559
Burnes, A.....	239	Claridge, T.....	467
Burnett, C. J.....	125, 149	Clark, G.....	288, 345, 378
Burns, W. H.....	446	—, G. A.....	408
Burr, A. R.....	490	—, W. 83, 95, 98, 119, 168,	
Burr, B. J.....	394	218, 228, 263, 272, 274, 282,	
Burr, D. A.....	333	286, 304, 325, 349, 400, 410,	
Burton, B.....	50, 342, 374, 454	420, 425, 471, 483, 534, 543	
—, J. H.....	37, 40, 478, 492	Clarkson, T. C.....	334
Bush, W.....	253	Claxton, F. S.....	368
Busse, F. B.....	22	Clay, W.....	72, 89
Bussey, G. G.....	15, 43, 437	Clayton, T.....	383
Byrnes, A.....	328	Clifton, H. E.....	418
Caesaris, C. de.....	497	Cochran, J. W.....	42, 67, 128,
Cail, R.....	405	420, 490	
Caire, M. A.....	505	Cocking, J. S.....	46
Calisher, H.....	511	Cohade, H. F.....	94
Campbell, J. C.....	277	Cohn, D.....	484
Canouil, G.....	64, 66, 98, 309, 511	Cole, A. L.....	145
Carle, J. F. C.....	429	—, J.....	500
Caro, H.....	512	Coles, C. P.....	289, 402, 562
Carr, J.....	430	—, H. T.....	166
Carter, A.....	143	Collette, V.....	5
—, H.....	532	Colley, A.....	440
—, J. M.....	93	Collins, W.....	370
Cashay, M.....	168	Colt, S.....	561
Cassegrain, T. F.....	244	Concannon, C. A.....	274
		Conybeare, J. C.....	A32

	Page		Page
Garrs, H. de.....	563	Grey, F. H.....	458
Garside, D.....	126	Griess, P.....	512
Gastinne, L. J.....	253	Griffiths, R.....	214
Gates, G.....	232	Grimston, T. A.....	404
Gatling, K. J.....	423	Gross, H.....	49
Gaudet, —.....	560	Grunbaum, J.....	484
Gedge, W. E.....	103, 343	Gruson, J. H. A.....	354
Genhardt, H.....	122	Gruson, J. H. A.....	545
—, W.....	406, 418	Guerriero, A.....	274
Gevelot, J. F. 263, 483, 534, 543		Gueury, F.....	420
Ghislin, T. G.....	127, 151, 564, 565	Gunner, J.....	477
Gibson, J.....	290	Gwyn, E.....	49
—, J. W.....	191		
Giffard, P.....	256	Haddan, J. C. 37, 55, 56, 81, 89, 116, 133, 175, 180, 198, 209, 296, 335, 527	
Gilbert, C.....	152, 198		
—, F. H.....	216	Hadfield, G.....	4
—, T.....	198	Hale, W. 23, 109, 341, 429, 563	
Girard, C. F.....	218	Hall, G.....	5, 279
Girdlestone, J. W.....	203, 229	—, J.....	505
Gisborne, F. N. 157, 161, 220, 382		—, T.....	70
Gladstone, H.....	315	—, W.....	387
Gloag, H.....	112	Halliday, M. F.....	136
Golden, C.....	122	Hammond, E.....	487, 527
Goodwin, F. C.....	351	—, H.....	487
Gornall, R.....	146	—, J.....	7, 30
Gosling, W.....	41	Hancock, T.....	558
Graeme, P. St. G.....	357	Hand, J. W.....	246
Grafton, H.....	502	Hanson, C.....	65, 146, 174
Grahame, T.....	118	Harding, G. P. 182, 260, 367, 392, 451	
Grainger, J.....	59, 92, 364	—, W.....	1, 72, 93, 107
Grant, A. G.....	3	Harlow, E.....	306, 530
—, J.....	116	—, J. T.....	306
—, S.....	168	Harmer, J.....	48
Gray, J.....	419, 494	Harris, A.....	217
—, S.....	207	—, J.....	199
Gray, T. W.....	219	Harrison, E. 115, 126, 177, 205, 337	
Green, C. E.....	86, 241		
—, J.....	86, 241	Harriss, J. P. 353, 381, 386, 389	
—, W.....	128		
Greene, R.....	442	Hart, G. W.....	331
—, W. V.....	422	—, T. J.....	51
Greener, W. W.....	303, 380	Hartshorn, J.....	271
Greenway, C.....	558	Harvey, C.....	100, 486, 508
Greenwood, T.....	117	Harwood, W. S.....	194
Gregory, J.....	304, 305	Haseltine, G. 245, 254, 264, 358, 437, 438, 440	
Greves, C.....	84		

INDEX OF NAMES.

xi

	Page
Hausman, J. B.	426
Hawker, T. P.	156
Hawksley, G.	274, 478
Hawksworth, W.	182, 260
Haycraft, G.	173, 268
Hayden, H. W.	361
Hayes, R.	184
Hayman, F.	552
Hazard, H. H.	164
Healey, E. C.	164
Heathorn, T. B.	463
Heaton, E.	198
Heinke, J. W.	442
Heintzmann, A.	269
Hely, A. A.	178
Hemming, S.	137
Henderson, T. F.	45
Hennessy, H.	311
Henry, A.	81, 129, 156, 428, 555
——, B.	328
——, M.	94, 166, 196, 208, 313, 485
Henty, G. A.	393
Henwood, C. F.	461
Herring, G.	120
Happleston, T.	104
Hewetson, H.	81, 117
Hickman, H.	179
Hill, T.	241, 270
——, W.	349
Hinton, J.	312
Hirst, W.	250, 355
Hitchcock, A.	254
Hobbs, W.	15, 509
Hochstaetter, F.	73
——, H.	73
Hodges, E. C.	465, 544
Hoffnung, A.	418
Holborow, E.	292
Holland, H. J.	172
Hollis, E.	114
——, J.	189
Holmes, N. J.	466
——, T.	226
Horne, G.	271
Hook, A.	299, 316
Hookham, R.	388

	Page
Hooper, W.	4
——, W. J.	146
Horsley, T.	207, 208, 308
Horton, J.	244
——, W.	294
Hatchkiss, B. B.	237, 439
Houghton, J.	217
Hovelacque, E. A.	313
Howe, E.	128
Howell, J. B.	296
Hoyt, J. R.	314
Hudson, W.	227
Hughes, E. T.	64, 68, 69, 268, 283, 336, 496, 526
——, E. W.	198
——, G. F.	252
——, J.	107
Hulett, D.	74
Hulse, W. W.	175, 266
Humbertjean, J.	103
Humfrey, C.	85
Hunt, J.	114
——, T.	501, 542
Hurry, H. C.	381
Huse, C.	472
Hutchins, H. E.	346
Hutchinson, W. N.	192, 311, 337
Hutchison, W.	310
Huxley, J. H.	372
Ince, T. H.	543
Inglefield, E. A.	320
Irvine, J.	246
Isaac, S.	75
Isherwood, J. C.	520
——, R.	520
Ituniaga, M.	247
Jackson, A.	383
——, J.	492
James, C. T.	60
James, C. W.	238
Janson, A.	207
Jaques, F.	132
Jardinier, P. D.	441
Jarre, P. J.	166, 485
Javelle, M.	164
Jay, J. B. A.	83

	Page		Page
<i>Minie, C. C. E.</i>	119, 410	216, 222, 235, 242, 245, 246,	
<i>Mole, F. M.</i>	118	256, 261, 265, 295, 297, 299,	
—, <i>R.</i>	118	300, 326, 357, 360, 367, 383,	
<i>Monckton, E. H. C.</i>	223	384, 391, 401, 408, 441, 452,	
<i>Moncrieff, A.</i>	401, 505	453, 457, 449, 461, 472, 481,	
<i>Mondon, M.</i>	294, 402	483, 485, 502, 507, 515, 517,	
<i>Monin, B. T. N.</i>	256	522, 525, 526, 548	
<i>Moore, D.</i>	247	<i>Nightingale, R.</i>	179, 216
—, <i>J.</i>	197	<i>Nobel, A.</i>	306, 367
—, <i>T.</i>	49	<i>Nobel, L.</i>	323
<i>Moreau, E.</i>	340	<i>Noble, A.</i>	326, 445, 511
<i>Morgan, H. J.</i>	79	<i>Noce, E. Della</i>	431, 460
<i>Morgenstern, W.</i>	365	<i>Nöel, S. A.</i>	420
<i>Morse, G. W.</i>	2	<i>Nolan, J. P.</i>	395
<i>Moulton, S.</i>	278	<i>Norman, W. N.</i>	91, 95
<i>Mourguet, J. B.</i>	130	<i>Norris, S.</i>	453
<i>Muir, A.</i>	382, 426	<i>Norris, S.</i>	466
<i>Munn, W. A.</i>	108	<i>Norton, B. R.</i>	135
<i>Murcott, T.</i>	174	<i>Norton, J.</i>	12, 276, 401
<i>Murdoch, G.</i>	290	<i>Nugent, G.</i>	197
<i>Murphy, W. J.</i>	469	<i>Nuthall, W. F.</i>	43, 81, 85
<i>Murrell, C.</i>	267		
<i>Mushet, R.</i>	52	<i>Oelkers, O.</i>	552
<i>Muschamp, J. B.</i>	549	<i>Ogier, P.</i>	55
<i>Myers, S.</i>	418	—, <i>S.</i>	55
		<i>O'Hagan, P.</i>	432
<i>Nadal, A.</i>	137	<i>Oldbury, J.</i>	46
<i>Naglost, G. B.</i>	163	<i>Opie, J.</i>	61
<i>Naglost, G. B.</i>	347	<i>Oriard, L.</i>	99
<i>Napier, J. M.</i>	225	<i>Oxland, R.</i>	113, 131
—, <i>R. H.</i>	339		
<i>Natorp, H. J.</i>	110	<i>Page, T.</i>	168
<i>Needham, G. H.</i>	457	<i>Paine, G.</i>	94
—, <i>J.</i>	134, 231, 365,	<i>Palis, F. C.</i>	223
	410, 457	<i>Palliser, W.</i>	88, 257, 286
<i>Nethersole, W. E.</i>	259	<i>Palmer, F.</i>	232, 247, 258, 547
<i>Neumeyer, G. A.</i>	440	<i>Palmer, J.</i>	293
<i>Neumeyer, G. A.</i>	550	<i>Palmer, W.</i>	21
<i>Neviers, A. de</i>	112	<i>Pape, W. R.</i>	505
<i>Nevill, W.</i>	80	<i>Parent, A. J. H.</i>	291
<i>Newton, A. V.</i>	15, 27, 42, 45,	<i>Parfrey, Y.</i>	216, 355
	48, 54, 97, 136, 205, 219, 257,	<i>Paris, M.</i>	123, 144
	276, 277, 278, 306, 343, 354,	<i>Parker, I.</i>	292
	424, 446, 452, 470	<i>Parkes, A.</i>	389, 468
—, <i>T.</i>	146, 199, 338	<i>Parsons, P. M.</i>	48, 70, 91, 111,
—, <i>W. E.</i>	2, 34, 35, 60,		150, 230, 234, 316, 324, 356,
	62, 100, 135, 142, 145, 146,		361, 377, 541
	151, 167, 177, 193, 207, 212,	<i>Paton, E.</i>	436

INDEX OF NAMES.

17

	Page		Page
Patotral, J. P. B. la.....	305	Preston, F.....	69, 101, 128
Payton, W.....	172	Price, D. S.....	327
Peabody, H. O.....	428	—, G.....	123, 124
Peck, M.....	372, 414	—, G. B.....	267
Peltier, E.....	176	Prince, A.....	453
Pender, J.....	42	—, F.....	31, 53
Penetone, W. la.....	443	—, F. W.....	105, 451
Pengelly, T. G.....	11	Pringle, W.....	465
Peniston, W. M.....	328	Pritchett, R. T.....	208
Peppercorne, G. R.....	557	Prodon-Bonneton, G.....	190
Perkins, H. B. C. L.....	446	Prdon, M. G.....	190
Perrin.....	62	Prowse, R. S.....	383
—, A.....	313	Pryse, C.....	275, 801
Perrin, J.....	293	Purchase, G. L.....	191
Perry, W.....	148	Purdey, J.....	140, 280, 416, 503
Peterson, C.....	26	Pursall, W.....	14
Petin, Gaudet, and Co.....	560	Pugchaumeis, M. J. E. du L.	
Petitio, E.....	375	de.....	429
Phillips, G. A.....	192		
Picken, J.....	138	Quin, R.....	3
Pidanet, M.....	543		
Pierson, C. T.....	48	Radley, J.....	329
Pigot, R. St. L.....	340	Rafael, R.....	246
Pigou, F. A. P.....	351	Ramsear, W.....	24
Pilton, M. R.....	13, 120, 318	Ramsey, C.....	243
Fitta, W.....	388	Ramsfacher, T.....	76
Plant, P.....	267	Rand, D. C.....	245
Plimsoll, H. D.....	508	Rave, N.....	68, 69
Plumerel, C. V.....	497	Rawbone, W. G.....	34, 251
Pocock, G. P.....	556	Redford, G.....	16, 21
Polain, P.....	448	Redman, R.....	370, 501
Pollak, A.....	283	Redondo, F.....	396
Pomeroy, J.....	212	Reed, F. J.....	272
Pope, E.....	299, 363	Reeder, J.....	244
Poppenburg, J. von der.....	416,	Reeves, C.....	9, 73, 134, 139,
	425, 534, 553		397, 472, 528
Porter, W.....	4, 239	—, F. W.....	549
Post, J. W.....	499	Reichen, C.....	449
Potter, E.....	212	Remington, E.....	326, 408, 466,
—, H. T.....	216		507
Pountney, W.....	370	—, P.....	326, 408, 466,
Powell, W.....	356, 529		507
Powers, T. J.....	539	—, S.....	326, 408, 466,
Poynter, J. E.....	310		507
Prater, C.....	93, 142	Rendel, G. W.....	163, 258, 352,
Pratt, A.....	242		455, 517
Pratt, E. L.....	499	Renton, A. H.....	403
Prentice, E. C.....	495	Regua, J.....	264

	Page		Page
Restell, T.	7, 395, 486, 538	Rydbeck, S.	39
Revy, J. J.	219	Ryer, W. M.	
Revy, J. J.	313, 433		
Reynold, E. D.	85	Saez, C. G.	28
Rice, W.	119	St. Ange, E. C. B.	
Richards, A. R.	289	Saffon, J. A.	
—, G.	224, 258, 301	Sagnes, J.	
—, R.	320	Sanborn, G. H.	
—, W.	17, 108, 174, 250,	Sanderson, C.	
264, 279, 388, 486, 513, 547		Sanger, J.	
Richardson, G.	120	Savage, E.	
Richardson, G. I.	459	—, W. P.	
Richer, F. C.	107	Saville, T. P.	36
Ricker, S.	260, 277	Sax, A.	
Ridgway, J.	256	Schaffer, B. A.	31
Rigby, J.	95, 134, 240, 341	Schenkl, F.	
Rikett, T.	471	—, J. P.	
Riley, W. S.	480	Schenkl, J. P.	
Ripplingille, E. V.	19	Schmaez, A.	
Risse, F. I.	112	Schmidt, C. F.	
Ritner, M.	245	Schneider, F. E.	167, 17
Riviere, Baron H. de.	168	Scholfield, J. M.	
Roberts, J.	197	Schultze, E.	30
—, M. J.	79, 103	Schwab, F.	
—, R.	560	Scoffern, J.	
—, T.	170, 202	Scott, E. E.	8
Roberton, J. W.	444, 540	—, J.	
Robertson, C.	171	—, J. G.	
—, P.	185	—, J. W.	18
Rochaz, C.	39, 404, 435	—, M.	
Roche, R.	219	—, R.	
Rochussen, T. A.	269	—, R. A. E.	519, 52
Rokde, A.	457	—, T.	
Roland, W. H.	329	—, W. M.	
Rollason, A.	121, 549	Sear, W.	
Rollett, G. H.	72	Sears, J. H.	
Romer, J.	259	Seeley, E. D.	
Rose, W.	14, 115, 223	Seipel, J.	
Rosson, C.	442	Sellar, A.	
Rousseau, A.	173	Selwyn, J. H.	
Rousseau, A.	231	Shaler, J. W.	
Rowan, J. M.	222	Shannon, A.	
Roy, T. W.	41, 145, 419	Sharp, J.	56
Rudolf, W.	502, 505	Sharps, C.	
Russ, E.	487, 527	Sharps, C.	29
Russell, C. H.	410	Shaw, C.	
—, N. S.	299	—, J.	
—, S.	35, 50	—, R.	

INDEX OF NAMES.

xvii

	Page		Page
Sir C.....	25	Spratt, H.....	56
m, T.....	80, 81, 132	Spurgin, J.....	58
d, E. C.....	342, 391	Stafford, C. W.....	272
, W. A.....	257	Stafford, P. P. L.....	287
H.....	237	Starr, E. T.....	236
J.....	193	"Starr Arms Company".....	95
s, W.....	526	Staunton, C. O.....	233, 476
tom, J.....	137, 170, 211	Stenhouse, J.....	197
, C. W.....	188	Stevens, W. H.....	135
, R. W.....	181, 230, 358, 397	Stiff, W. C.....	268
H. J.....	63, 161	Stokes, J.....	238
, F. C.....	108	——, W.....	238, 513
i, J. S.....	60	Storm, W. M.....	131
m, G. F.....	231	Storm, W. M.....	421
A.....	26, 59	Stoughton, A. B.....	60
B.....	202	Stow, W.....	85
D.....	44	Strong, S.....	309
G.....	34	Stuart, G.....	533
G.....	50, 285	Sturrock, G.....	91, 172, 494
G. A.....	62	Suares, G.....	5
J.....	63, 78, 323	Sudre, M.....	28
J. T.....	210	Sutherland, E.....	394, 405
P. R.....	6, 25, 125	——, H.....	394, 405
R.....	502, 541	Sweney, C.....	179
T.....	563	Swinarski, E.....	403
W.....	304, 305	Swinburn, J. F.....	20
W. H.....	41	Sylvén, T. G.....	490
W. H.....	127		
W. T.....	7	Taylor, T.....	431
r, C. E.....	417	Taylor, W.....	239
W.....	288, 386	——, W. R.....	126
, J. 169, 238, 281, 302,		Telescheff, N. de.....	362
350, 360, 390, 397, 409,		Tessier, C. H.....	195
449, 476		Thackeray, T. J.....	430
, Cordier and Company		Theate, T.....	332
	218	Therasson, J.....	278
J. H.....	191	Thomas, L.....	187, 392
W.....	448, 498	Thomas, P. E.....	134
S.....	459	Thomas, W. L.....	10, 177
M. A.....	293	Thompson, B.....	198, 417
s, W.....	43, 129, 212, 277, 434	——, J.....	278, 332, 393
er, F.....	552	——, N.....	302, 331, 344, 385, 405, 474
r, C. M.....	151, 386	Tice, I. P.....	276
r, G.....	148	Tipper, H. P.....	441
, E.....	444	Tjader, C. J.....	23
, G.....	88	Tolhausen, F.....	164, 294, 420
		Tongue, J. G.....	396, 508, 544

	Page		Page
Tonkin, J.....	206	Walker, M. A.....	32
Townsend, G. W.....	84	——, R.....	32
——, J.....	26, 206	——, —.....	41, 145
Tranter, W. 243, 294, 443, 518		Waller, F.....	212
<i>Treadwell, D.</i>	259, 348	Wallis, C. E.....	304, 344
Treeby, T. W. G. 5, 21, 55, 198		Walsh, J. H.....	102, 121, 270,
<i>Trets, A. E. C. J. R. de</i>	44	297, 379, 480	
Tronchon, A. P.....	263, 423	<i>Walsh, J. J.</i>	110
Trulock, R.....	290, 409	Walton, J. H.....	78
——, S.....	290, 409	<i>Walton, T. H.</i>	384
——, W.....	290, 409	Ward, W. H.....	68
Tucker, S. D.....	246	Warmington, E. J.....	548
Turner, T. M.....	236	Warner, A.....	195
——, T. 98, 239, 382, 385, 526		<i>Waples, R.</i>	267
<i>Tyler, C.</i>	212	Warry, R.....	25, 41, 63, 157, 520
		Waters, H.....	77
Ulrich, J. G.....	400	<i>Waters, H.</i>	325
Unwin, J.....	129	Watson, A.....	145
Unwin, P.....	129	——, W.....	145
		Watts, J. B.....	271, 277
<i>Vail, T. J.</i>	304, 522	Wayne, J. B.....	300
Vallance, P.....	113, 161	Webb, J.....	96
Van Braam, J. A.....	165	——, W.....	498
Vandenburgh, O. 96, 130, 133		Weber, W.....	550
Vasserot, C. F.....	25	Webley, P.....	174
Vaughan, J.....	189	——, T. W.....	174, 446, 544
Vavasseur, J.....	172, 268, 512	Webster, J.....	12
Vernede de Corneillan, J.		Weldon, W.....	519
—— L. H. C. Comtesse de.....	215	Wells, J.....	279
Vetterlin, F.....	192	——, J. G.....	463
Vieillard, E. N.....	29	——, T. F.....	192
Vickers, T. E.....	262	Wentworth, S. T.....	57, 68
<i>Vin, J. B.</i>	94	Westwood, S.....	387
Vogl, D.....	76	Wethered, E. R.....	489
Von der Poppenburg, J.....	416,	Whitby, T.....	47, 66
425, 534, 553		<i>White, G.</i>	191
<i>Voruz, A. A.</i>	357, 453	Whitworth, Sir J.	21, 57, 74,
——, J. S.....	297	175, 209, 234, 266, 336, 461,	
		521	
Waddell, C. D.....	106	Wiard, N.....	273
<i>Wadshaw, M.</i>	245	Wickham, T.....	366
<i>Walch, J.</i>	54	Wigfall, W.....	317
Walker, B. P.....	181	Wilkins, G.....	330
——, F. E.....	270, 495	<i>Wilkinson, J.</i>	212
——, H.....	300	Wilkinson, W.....	259
——, J.....	348, 375, 450, 482	Wilks, W. H.....	367
——, M.....	183, 217	Willetts, S. C.....	320
		Williams, A. H.....	371

INDEX OF NAMES.

xix

	Page		Page
<i>Williams, E. D.</i>	236	<i>Winsor, W. D.</i>	425
<i>Williams, E. W.</i>	26	<i>Witney, C.</i>	463
——, <i>H. H.</i>	457	<i>Wood, J. A.</i>	508
——, <i>J.</i>	384	——, <i>S.</i>	212, 308, 347
——, <i>L. E.</i>	516	<i>Wood, S. W.</i>	412
——, <i>R. T.</i>	538	——, <i>W.</i>	152, 551
<i>Willmot, G. R.</i>	457	<i>Woodbury, J.</i>	207
<i>Wilson, E.</i>	381, 498	<i>Woodward, R.</i>	145
——, <i>E. B.</i>	129	<i>Woodward, T.</i>	404, 504
——, <i>F. A.</i>	398, 442	<i>Woolcombe, R. W.</i>	161
——, <i>J. C.</i>	313	<i>Worms, H.</i>	280
——, <i>J. H.</i>	376	<i>Wyley, A.</i>	180, 364, 366, 535
——, <i>J. W.</i>	75	<i>Wynants, F.</i>	219
——, <i>T.</i> ...32, 35, 36, 45, 76,		<i>Yates, J. A.</i>	272
90, 103, 109, 115, 124, 322,		<i>Yates, T. S.</i>	177
359, 368, 370, 373, 376, 377,		<i>Yeakel, D. T.</i>	222
399, 436, 468, 493, 515, 533,		<i>Yvose Laurent, L.</i>	344, 373
540, 546		<i>Zorn, F. W.</i>	122
<i>Winans, W. L.</i>	200, 214		
<i>Winchester, O. F.</i>	282, 471, 526		

FIRE-ARMS AND OTHER WEAPONS, AMMUNITION, AND ACCOUTREMENTS.

1858.

A.D. 1858, February 25.—N° 378.

MIDDLETON, SAMUEL.—“Improvements in the uniting or
“seaming articles of leather, and in the apparatus connected
“therewith.”

Articles of leather, such as sheaths for swords or bayonets, are made by working the leather in a damp state with “thin glue or
“paste, or otherwise. The edges intended to be united are
“brought close together, and a wire is then passed through them
“and is drawn tight” by pulling as in lacing. The edges are then pressed in a die closely together, and when the leather is dry they are “very little perceptible.”

(This Abridgment should have been inserted in Part I.)

[Printed, 2s. 4d. Drawings.]

A.D. 1858, May 24.—N° 1159.

HARDING, WILLIAM.—“Improvements in revolver fire-arms.”

The cylinder containing the chambers is arranged to turn on two centres in the frame or body of the revolver. The frame is made up of two pieces, the lower one being made in one piece with the stock, the upper one in one piece with the barrel. The two parts are connected by means of a toothed projection at the fore end of the lower part, and a notched piece entering between projections and secured by a pin or screw at the back end of the upper part. The pin or axis of the cylinder may be carried by one of the frames.

The hammer carries an inclined piece, upon which a projection formed on the trigger acts so as to raise the hammer, which

 F.A.

A

escapes after the incline is passed. After falling and exploding the cap the trigger returns by the action of a spring to its former position.

[Printed, 10d. Drawing.]

A.D. 1858, May 25.—N° 1164.

MORSE, GEORGE WOODWARD.—“An improvement in fire-arms and cartridges to be used therewith.”

A breech-loader is used with a metallic cartridge case. A percussion rod is made to act in a moveable breech-piece in such a manner that the lock in the act of firing shall lock the breech-piece and fire the charge. On the front of the moveable breech-piece is a globular surface, which combined with a cylindrical cartridge case prevents escape of gas. The cartridge case is drawn out by a lever. To convert a muzzle-loader into a breech-loader the upper part of the breech end of the barrel is cut out and a chamber is hinged to the breech-piece, being loaded by turning it up. The cartridge case is formed with an “expansible head” inserted in the rear end of it. The percussion priming is exploded by means of an “anvil-piece.”

[Printed, 8d. Drawing.]

A.D. 1858, May 25.—N° 1172.

NEWTON, WILLIAM EDWARD.—(*A communication*).—“Improvements in breech-loading fire-arms and cartridges for the same.”

The breech is closed by a “slide motion” which at the time of closing forces the bullet into the rifled barrel. The lock is placed within a “hinged unchambered breech-piece,” the hammer being a “straight plunger” working in a hole in the breech-piece. The rear of the breech is forced up against the stock by means of an adjustable screw. A vent plug having “a spring lip,” formed by a steel ring turned thin at its edge, is used to communicate the fire of the priming to the charge, the lip being opened to communicate the fire of the priming while it is closed on discharge, so as to prevent the escape of gas. An elastic metallic lip attached to the breech end of the barrel and elastic packing are also used. A metallic cartridge of a conical form is used, the neck of the cartridge is externally no larger in circumference than that of the

ball. The cartridge is extracted by means of a "tooth" attached by a pin to the breech-piece.

[Printed, 8d. Drawing.]

A.D. 1858, June 1.—N° 1231. (* *)

GRANT, ALONZO GAYLORD.—(*Provisional protection only.*)—

"An improved stand or rest for cameras, theodolites, guns, and other articles."

"This stand consists of three or more legs which when brought together unite in the form of a cylinder. The upper ends of these legs are hinged or jointed to a metal boss, with a hole through the centre thereof. In the hollow of the boss there is a collar in the shape of a split ring, and through this collar passes a shaft carrying at top a table or other holder, according to the nature of the article to be held or supported. To the inside of each of the legs one end of a rod is connected, while the other end of each rod is connected to a collar through which the central shaft passes. When folded up, the rods lie in a groove made for their reception inside the legs. In order to fix the table or other holder at any required height, the split ring is made to grasp and nip the central rod by a screw passing through the side of and worked from the outside of the boss."

[Printed, 4d. No Drawings.]

A.D. 1858, June 4.—N° 1262.

QUIN, RICHARD.—(*Provisional protection only.*)—"Improvements in ordnance and fire-arms."

In the case of ordnance it is proposed to make a slot in the breach end of the piece, and to make a chamber piece, or block, slide in the slot. When the position of the sliding piece is central both chambers project, one on each side of the piece, and in that position they are loaded, at the same time the piece is sponged through an orifice left between the chambers. When the chambers are charged they are alternately pushed into the barrel and locked in the proper central position. For small arms a sliding piece with one chamber is used.

[Printed, 4d. No Drawings.]

A.D. 1858, June 5.—N° 1273.

PORTER, WILLIAM.—(*Provisional protection only.*)—"Improvements in artillery, ordnance, and some other descriptions of fire-arms."

It is proposed to fit in the interior of the gun a rod or stem that passes from the breech to the muzzle, or nearly so. The rod has a spiral shape, or grooves are formed on its surface, and the projectiles used have orifices made in their centres, so that when a projectile is loaded it is passed along the internal rod or stem, and when fired rotatory motion is thereby communicated to it so as to produce the effect of rifling.

[Printed, 4d. No Drawings.]

A.D. 1858, June 5.—N° 1274.

HOOPER, WILLIAM.—(*Provisional protection only.*)—"Improvements in the manufacture of projectiles."

It is proposed to employ in the manufacture of projectiles hard compounds of india-rubber, sulphur, and metals, or metallic salts. In some cases the compounds are used to form the bodies of the projectiles, in other cases for coating them.

[Printed, 4d. No Drawings.]

A.D. 1858, June 5.—N° 1275. (* *)

HADFIELD, GEORGE.—"Improvements in the protection of carboys, or other vessels and packages." "This invention relates mainly to the adaptation to carboys and other vessels, of a partial or complete outer casing or covering, for the purpose of increasing the strength or stability of the vessel." It relates also to the "protection of packages of various kinds enclosed within cases constructed of parts that are capable of being readily separated when desired."

In the Specification there is a description of a vessel for holding gunpowder, protected by a casing of wooden staves similar to a cask. The vessel, which is made of copper, is formed with a flat head, with an opening for a plug. A flange, projecting laterally from the head, enters an annular groove in the wooden casing, and thus, when the hoops that hold the staves are put on, the inner and outer vessels will be firmly united together. A removable head of wood is applied to this vessel, and secured thereto by brads or otherwise.

[Printed, 10d. Drawing.]

A.D. 1858, June 9.—N° 1296.

SUARES, GEORGE.—(*A communication from Victor Collette.*)—(*Provisional protection only.*)—"An improvement in fire-arms."

Fire-arms are proposed to be made with a charge tube attached to the stock of the arm. A tube is to be placed at the top of the barrel, and a number of charges inserted in it. The charges are to be conducted to a chamber and fired in rapid succession.

[Printed, 4d. No Drawings.]

A.D. 1858, June 9.—N° 1306.

TREEBY, THOMAS WRIGHT GARDENER.—(*Provisional protection only.*)—"Improvements in revolving fire-arms, and cannon "and cartridges."

The improvements are stated to be based on those for which a former Patent was obtained, dated January 10, 1856. The chains referred to in the Specification of the former Patent are to be hinged at the side instead of the centre of the chambers. Instead of a ramrod being used the charge is sent home by means of a lever and screw, or lever and cam. The cartridge has a metallic ring at its base so placed as to secure the percussion cap in the centre of the base. Strikers or plungers are attached, one to each chamber.

[Printed, 4d. No Drawings.]

A.D. 1858, June 10.—N° 1321.

HALL, GEORGE.—"Certain improvements in cartridges."

The charge is placed in a cartridge case so constructed that the case may be inserted in the muzzle of the gun and be forced by a ramrod through the case and down to the bottom of the barrel. The case may then be removed and thrown away, or may be used for other charges. The case may be made of paper, gutta percha, metal, or any suitable substance. The cartridge cases are fastened with strings, so as to retain the charge in them until the pressure of the ramrod is applied, when the strings give way and release the charge. In some cases the bottom of the cartridge is closed by a disc attached to a side strap or string.

[Printed, 8d. Drawing.]

A.D. 1858, June 16.—N° 1361.

LANCASTER, CHARLES WILLIAM.—“An instrument or apparatus for charging cartridges for breech-loading arms.”

The instrument consists of “a cylinder with a sliding or hinged plate” attached to it so as to form a bottom. A plunger formed with a shoulder is made to work up and down in a suitable guide. The cartridge case is introduced open end upwards through the lower part of the cylinder, the bottom is then closed; the cartridge is filled and rammed by the plunger. The wad is then placed over the powder, and then the shot or ball, and where requisite, another wad, and the cartridge is finished by means of a “grooved tool.” The finished cartridge is then pushed out and replaced by another.

[Printed, 10d. Draw ing.]

A.D. 1858, June 18.—N° 1378.

SHAW, JAMES. — (*Provisional protection only.*) — “Improvements in fire-arms.”

A safety bolt is proposed to be used for locking the hammer. The heel-plate or metal cap at the end of the stock is hinged, and is attached to a rod connected with the sear in such a manner as to prevent it from being raised by the trigger from the notch of the tumbler, at all times, except when the rod is pushed forward by pressure, such as is exerted when the stock of the piece is pressed against the shoulder. The pressure on the butt-plate causes the rod to pass away from the tail of the sear, and allows it to be freely acted upon by the trigger.

[Printed, 4d. No Drawings.]

A.D. 1858, June 25.—N° 1435.

SMITH, PETER RECTOR.—(*Provisional protection only.*) — “Improvements in fire-arms and ordnance, and in the projectiles to be used therewith.”

The inside of the barrel is to be made of iron or steel, and a cylinder composed of rings of several metals is mounted upon it; or the outside piece may be cast and a steel lining be fitted inside it. “Directing pieces” are to be attached to projectiles, so that the air may act upon them and obviate the necessity of rifling the barrels.

[Printed, 4d. No Drawings.]

A.D. 1858, June 28.—N° 1451.

HAMMOND, ISAAC.—“Drawing the cartridge case from the barrel of a breech-loading gun.”

The barrels are “secured by a tumbler seated in the breech in front of a lump on the barrels, and connected by a pin through the fore part of the breech.” A lever is attached to the tumbler in front of the trigger guard; by turning it through a quarter of a circle the barrels are released and fall into the position for loading. The empty cartridge cases are at the same time withdrawn by means of a self-acting spring lever, which slides through the lump on the barrels. One end of the lever holds the cartridge case, the other is acted upon “by an inner pin attached to the breech.”

[Printed, 4d. No Drawings.]

A.D. 1858, July 2.—N° 1482.

SMITH, WILLIAM; THOMAS.—“Improvements in and the combination of certain machinery or apparatus for winnowing, washing, sifting, and separating grain, ballast, sand, shot, minerals and other materials.”

Sifters are arranged in succession one above another; “the wire-work is not placed horizontally but at an angle with the sides.” The meshes of the wire-work “gradually diminish in size,” “girling motion” is given to the sifters by means of cams and wheels, and the material to be sifted is fed into the upper sifter by a self-acting hopper.

[Printed, 8d. Drawing.]

A.D. 1858, July 3.—N° 1497.

RESELL, THOMAS.—“Improvements in breech-loading fire-arms and ordnance, and in ammunition to be used in breech-loading arms.”

The improvements are based upon those described in the Specification of former Letters Patent of October 14, 1857. The breech of breech-loading arms is closed by a wedge or bolt working in a box behind the percussioning, actuated by a lever or arm affixed “at the top of the edge thereof” in preference to the side. A flat “disc of steel with a cylindrical nose to enter the barrel” may be used. The side of the hammer is

cut away or flattened to allow the lever and bolt to act freely. The nipple is drilled with a hole in the side of the screwed portion, so placed that the cartridge is ignited in the middle. A pin or stud upon the under side of the hammer is so arranged as to prevent the hammer discharging the cap before the breech is fairly closed. The cartridge used has a deep recess in the back which is made grease-proof and is filled with lubricating matter.

For breech-loading cannon "a very thick head of wrought iron " or other metal " is screwed on the rear of the gun, through which is passed " an axle with an inclined groove upon it " which is worked by a lever. A nipple is screwed into the touch-hole, and is provided with an arm or lever to enable it to be " screwed " in and out."

[Printed, 2s. 2d. Drawings.]

A.D. 1858, July 15.—N^o 1593.

BRAZIER, RICHARD.—"Improvements in repeating fire-arms."

The cock or hammer is raised by a hooked link jointed to the tumbler, and connected with and actuated by the trigger. The mainspring is jointed to the hooked link. The hammer is "held " in cock by a sear on the upper part of the cock engaging in "bents on the front of the cock," being disengaged by the trigger on discharge. The revolving chamber is turned by a plate to which it is jointed; the plate turns on the same centre as the hammer, and is urged by a projection on the side of the tumbler. In the plate is a slot in which a pin on the side of the upper part of the trigger engages. When the hammer is raised by the thumb the plate draws back the trigger. A lever raised by the trigger locks the revolving chamber; a sliding safety bolt is also used to lock the chamber. A jointed lever is made to actuate a short loading rod or plunger attached underneath the barrel; the outer end of the loading rod has a pin which works in the curved short arm of the lever, so as to receive a reciprocating motion as the long arm of the lever is moved.

[Printed, 6d. Drawing.]

A.D. 1858, July 15.—N^o 1595.

ASTON, CHRISTOPHER PENRHYN.—"Improvements in breech-loading arms."

"A cup or cup-like seat " is formed in the heel to receive the

rear end of the barrel, which is made conical to fit. The barrel is made "to slide to and fro in a direct line with the breech by means of a lever handle. By preference the "percussioning is formed "in the breech," but it may be applied to the barrel.

[Printed, 10d. Drawing.]

A.D. 1858, July 16.—N° 1611.

BENNETT, WILLIAM ANTHONY BURLTON.—"Improvements "in military capes or cloaks."

The cape or cloak is made of a rectangular shape, so formed that several cloaks may be buttoned or otherwise united together and form a tent, which may be upheld by muskets or suitable uprights. Each cloak is by preference made about 84 inches long by 54 inches wide. In the centre of the cloak is formed a slit for the passage of the head of the wearer.

[Printed, 6d. Drawing.]

A.D. 1858, July 19.—N° 1623.

REEVES, CHARLES.—"Improvements in repeating fire-arms."

The hammer is raised by means of a tooth fixed on its lower part, which is moved by another tooth upon the trigger; one of the teeth is jointed so as to enable the teeth to pass during the return motion. The trigger is depressed by a forked lever when the hammer is raised by hand, as described in the Specification of former Letters Patent, dated Dec. 4, 1857. The revolving chamber turns on an axis, on which is a "quick-threaded "screw engaging in the anterior part of the frame, in which the "revolving chamber works, so as to advance and recede in the "frame as the axis is made to rotate."

[Printed, 6d. Drawing.]

A.D. 1858, July 20.—N° 1634.

BAILEY, THOMAS.—"Improvements in repeating fire-arms."

The working and actuating parts of the lock are contained inside the body of the arm. The axis of the tumbler passes through the side of the body, and the cock is fixed and works outside. The ratchet working the revolving chamber is moved by a lever attached to the tumbler. The chamber is made without a hole for a spindle and turns on two centres. The barrel is connected to

the body of the arm by a "circular hook joint," one part of which is on the under side of the body, the other on the under side of the barrel. A "circular stud or projection is on the top strap of the barrel," and passes into "a suitably formed recess on the upper side or head of the body." The hammer is cocked either by hand or by means of a lever connected with the trigger acting on the tumbler; or the arm is discharged by causing "the trigger to the tumbler up to cock," allowing the arm to be discharged like a fowling-piece. The revolving chamber is stopped by a spring stop acting on the ratchet and moved by a cam on the tumbler. A notch is formed in the "cock nose" to allow it to rest on the solid part of the chamber in a safe position. The loader is worked by a wheel and rack."

[Printed, 1s. Drawing.]

A.D. 1858, July 22.—N^o 1655.

THOMAS, WILLIAM LYNALL.—"Improvements in ordnance, fire-arms, and apparatus generally in which gunpowder is employed."

"Fire-arms, ordnance, and apparatus in which gunpowder is used" are constructed "according to the impulsive force or action of impact exerted by gunpowder upon the object to be moved, and according to the fact that the initial force of relative quantities of powder exerted on the shot, the charges being of the same form, increases in a much greater ratio than the quantity." The guns are so made that "the strength of metal at the breech increases in a higher ratio than that of the calibre."

Testing apparatus to show the strength of the powder is made by forming a recess in a block of metal and firing a ball whose ascent is measured by a graduated rod.

[Printed, 6d. Drawing.]

A.D. 1858, July 26.—N^o 1686.

DAVIES, JOHN.—(*Provisional protection only.*)—"Improvements in cloaks for military and other purposes."

A cloak, which will also serve to make a tent for the wearer, is to be made by uniting four triangular pieces of fabric, each having two straight and one curved side. When worn as a cloak the open seam is in front; when used for a tent the seam is buttoned

up, and a closed hood is attached to the neck and is supported inside upon a pole to form a tent.

[Printed, 4d. No Drawings.]

A.D. 1858, August 12.—N° 1840.

JOBSON, ROBERT.—"Improvements in apparatus used when making moulds for casting shells and other articles."

The pattern used is made with arms or projections carrying pins which enter sockets in the table or plate on which the box is placed. When the pattern is adjusted on the table the ends of the pins and sockets are filed off so as to make their ends exactly coincide, and any irregularity due to sand getting between the surfaces may be detected. The sand used is shovelled on to sieves worked mechanically; the sand is damped and the sifted sand is carried by a screw in a suitable trough or tube to a mixer, and thence through another trough to the moulder. The work is moved by a quadrant crane worked by a fly wheel giving motion to cog wheels working in a rack.

[Printed, 1s. 4d. Drawings.]

A.D. 1858, August 13.—N° 1847.

MANCEAUX, FRANÇOIS JULES.—"Improvements in stocks for fire-arms."

Stocks are made of thin wrought-iron plate. The part "in front of the lock is open" and curved "to receive a block of wood" for the barrel to lie in. A sheath or covering of damped hide or leather is stretched over the stock frame. When dry it is heated, plunged into a bath of melted wax, and then polished. A solid butt is screwed on to the end of the frame; a metal plate is screwed outside the leather to receive "the friction from the working of the hammer of the lock."

[Printed, 1s. 4d. Drawings.]

A.D. 1858, August 13.—N° 1854.

PENGELLY, THOMAS GOLSWORTHY, and BROWN, HENRY.—(*Provisional protection only.*)—"Improvements in apparatus for straightening gun barrels."

It is proposed to straighten barrels by the action of a series of hammers arranged in a row in an iron frame, mounted on swivels

like those of a telescope. The hammers are actuated by wheels and levers in such a manner that a workman may set in motion any required hammer by means of a hand wheel. The barrel to be straightened is placed in a groove in the frame in such a manner that a workman may "take the shade of the inside barrel." When a short or longer "bend" is perceived in the barrel, the requisite hammers are set in motion and strike evenly upon the barrel until the defect is removed.

[Printed, 4d. No Drawings.]

A.D. 1858, August 17.—N^o 1871.

WEBSTER, JAMES.—(*Provisional protection only.*)—"A new or "improved projectile."

The projectile is proposed to be made of "an external figure resembling that of the Minie bullet, and having a hole in its "axis, which said hole is rifled, or has a series of helical grooves "or planes formed therein." The action of the air upon the inclined rifling surfaces formed in the projectile will cause the projectile to rotate as it progresses through the air.

[Printed, 4d. No Drawings.]

A.D. 1858, August 17.—N^o 1875.

NORTON, JOHN.—"Improvements in projectiles."

To prevent the leading of barrels of small arms, and the injury of those of large ordnance by the projectile as it is propelled through the barrel, the projectile is coated by casting it in a case of paper, leather, skin, or other suitable material, or by pasting or cementing the material to the projectile. The case is pressed into a mould, and the projectile is cast in the mould. For ordnance a jacket or skin is formed of thin copper or other suitable metal, and is filled "with artificial stone cement or other hard material."

[Printed, 6d. Drawing.]

A.D. 1858, August 17.—N^o 1878.

LICHTENSTADT, DAVID, and DUFF, CHARLES.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in "treating tan and tanning refuse to obtain valuable products "therefrom."

The refuse of tan oak bark is converted into charcoal suitable for manufacture into gunpowder and for other purposes. The tan refuse is dried and then placed in closed retorts; the products given off may be distilled and the residue is a charcoal that may be used in making gunpowder.

[Printed, 4d. No Drawings.]

A.D. 1858, August 18.—N° 1879.

LUIS, JOZÉ.—(*A communication.*)—"A new safety system for preventing an accidental discharge in fire-arms."

A safety catch is attached to the lock so as to prevent the trigger from releasing the hammer. The catch is acted upon by a rod connected with a sliding piece in the heel plate.

When the stock is pressed against the shoulder the sliding piece is pressed inwards and the safety catch is released; the trigger is then free to act, while at other times it is locked.

[Printed, 8d. Drawings.]

A.D. 1858, August 23.—N° 1911.

PILON, MARTIN REGUL.—"Improvements in the manufacture and construction of fire-arms and in the means of loading the same."

In order to control the recoil of fire-arms springs are connected with the barrel so as to absorb the recoil. In some cases the recoil is made to act upon suitably arranged cog wheels. Cannon are loaded through the breech, which is closed by a cap or stopper, against which a spring presses. Small arms are made in two parts, to one of which the barrel is connected, so that its recoil acts upon springs. The charge for breech-loaders is contained in "a metallic charge bearer or cartridge."

[Printed, 4d. No Drawings.]

A.D. 1858, August 30.—N° 1966.

LINDNER, EDWARD.—"Improvements in breech-loading fire-arms and ordnance, and in cartridges."

A screw thread is cut on the rear side of the barrel which takes into a nut held in a frame. The breech chamber is at the rear end of the barrel, and turns up on a hinge. The rear end of the barrel is joined to the breech chamber by a conical collar fitting into a groove in the breech chamber. By turning the barrel it is

The primers are composed of the usual ingredients and are made in thin flat discs, which are arranged one upon another in a tube attached by means of shellac or caoutchouc in the form of a roll, which may be cut into suitable lengths. Tin foil or other thin metallic covering is used instead of copper for the side of the primer that comes in contact with the cone. The roll of primers is placed in a charging tube or carrier having a false moveable bottom, and operated upon by the lock tumbler fitted into the stock of the fire-arm; a spring pushes forward the primers. When the hammer is raised beyond half cock a primer is detached, and as the hammer falls it is placed on the cone and is there exploded. A cone cleaner or scraper is used to remove any deposit from the cone.

[Printed, 6d. Drawing.]

A.D. 1858, September 16.—N^o 2095.

REDFORD, GEORGE.—(*Provisional protection only.*)—"Making cartridges of metal or gutta percha with or without bullets and for other purposes."

A sheet of metal or gutta percha is proposed to be made into cartridges by means of punches and dies. The sheet is first made into a case of cylindrical or conical shape by a short die, and the case is then elongated to the required length by using a longer punch.

[Printed, 6d. Drawing.]

A.D. 1858, September 18.—N^o 2108.

BEASLEY, JOSEPH BLACKWOOD.—"Improvements in the construction of sporting and all other guns."

A safety catch is attached to the lock; it consists of a sliding bolt or stop, which is constantly urged forward by a spring and prevents the hammer striking on the nipple. In connection with the sliding bolt is a plate, so placed as to be conveniently grasped by the hand when the gun is in a position to be fired. The grasp or pressure of the hand acting upon the plate draws back the sliding bolt and so enables the hammer to fall on the nipple. When the grasp is released, the sliding bolt again is free to act, and prevents the hammer from falling on the nipple when the trigger is pulled.

[Printed, 10d. Drawing.]

A.D. 1858, September 20.—N° 2112.

CHESTER, JOSEPH LEMUEL.—(*Partly a communication.*)—(*Provisional protection only.*)—"An improved cartridge opener " and ramrod fastener."

A spring having a serrated or toothed edge is to be attached to the stock of the fire-arm near to the muzzle. When the cartridge is to be opened it is inserted under the spring and its roughened edge is pressed by the thumb, so as to enable the covering of the cartridge to be torn open. The spring may be also so arranged as to act as a holder to retain the ramrod in its place.

[Printed, *4d.* No Drawings.]

A.D. 1858, September 20.—N° 2113.

BARROW, HENRY.—"An improvement or improvements in " cartridge boxes."

A partition or diaphragm of cardboard, leather, or other stiff material is fitted in the cartridge box. It is perforated with a series of holes large enough to admit the largest sized cartridges. Underneath the partition is attached a sheet or layer of vulcanized rubber perforated with holes, concentric with those of the partition, and not larger than the smallest sized cartridge intended to be carried. Cartridges of any required size may be thus firmly held in the box.

[Printed, *6d.* Drawing.]

A.D. 1858, September 24.—N° 2149.

RICHARDS, WESTLEY. — "Improvements in fire-arms and " cartridges."

In breech-loading fire-arms, where plugs or sliding pieces are used for closing the breech, a hook-shaped instrument is connected with the sliding piece so as to take hold of and extract the rear end of the cartridge case when its charge has been exploded. The extraction takes place when the sliding piece is drawn back to admit a fresh cartridge. A wad, and in some cases for shot cartridges, a metallic thimble is attached to the base of the cartridge, so as to form a tight joint. The wad or thimble may be removed by the extractor, or in some cases be pushed forward by the next charge, in which case the charge is fired by an explosion tube.

In constructing breech-loaders with two barrels, the two barrels and part of the stock are hinged on a horizontal axis, and the rib between the barrels is made to extend back and form "a hook, eye, or other suitable fastening, which is locked in position by one end of a lever forming a counter hook or fastener. The locking lever securely attaches the barrels to the fixed breech or plate; it is mounted on the top of the stock, and is moved sideways to release the fastener that holds the barrels in position. Sometimes leathern straps are used instead of metallic straps for attaching the barrel to the stock."

[Printed, 1s. 2d. Drawings.]

A.D. 1858, September 25.—N^o 2155.

FARNCOMB, EDWARD.—(*Provisional protection only*).—"Improvements in lilliputian fire-arms."

A metal barrel is to be attached to a wooden stock in which is fitted a spiral spring. The spring is set by the hammer and released by a needle trigger.

[Printed, 4d. No Drawings.]

A.D. 1858, October 5.—N^o 2211.

BROWN, JOHN HARCOURT.—"Improvements in the manufacture of projectiles."

Projectiles having conical or pointed fronts are made with spiral passages formed inside them, so that the air acting on the inclined sides of the internal passages as the bullet passes onwards may give it rotation. The lubrication may be placed in grooves, formed in the rear of the bullet, whether hollow or solid, or be placed between two discs behind the bullet and be covered with paper or skin. When the piece is fired the discs are pressed, and the lubricating matter is pushed out and distributed inside the barrel.

[Printed, 6d. Drawing.]

A.D. 1858, October 5.—N^o 2213.

BROWN, JOHN HARCOURT.—"Improvements in the manufacture of cartridges."

Cartridges are so constructed that the charge may be forced through them into the barrel by the ramrod. The end of the

barrel of the fire-arm is made with a shoulder or recess, and the powder end of the cartridge case is enlarged. The powder end is closed by a stopper of cork or other suitable material. When the piece is to be charged the stopper is removed from the cartridge, and it is placed in an inverted position in the muzzle of the barrel; the charge is pushed through the cartridge case by the ramrod, and the cartridge case is then thrown aside.

[Printed, 8d. Drawing.]

A.D. 1858, October 8.—N° 2235.

LEETCH, JAMES.—(*Provisional protection only*).—"An improved method of constructing fire-arms."

The barrel of the fire-arm is to be bored completely through, and the breech end closed by a plug which has a hole through it. The breech is opened or closed by turning the plug, whose action somewhat resembles that of a common water tap."

[Printed, 4d. No Drawings.]

A.D. 1858, October 8.—N° 2236.

RIPPINGILLE, EDWARD VILLIERS.—"The improvement of fire-arms & artillery."

In constructing the gun lock extra metal is left on the "scire" or "tumbler" to admit of a catch being filed on the lower edge, to "arrest the scire point as the scire revolves in the descent of the cock." The cock is thereby held and accidental explosion from a fall of the gun is prevented. The Prussian needle gun mode of igniting a cartridge is used. The barrel is enlarged at the bore like a blunderbuss. A compound bullet or "mass of slugs" is used for small arms, and a similar charge is adapted for cannon.

[Printed, 8d. Drawing.]

A.D. 1858, October 8.—N° 2243.

LANCASTER, CHARLES WILLIAM.—"A metal or metallic alloy especially adapted to the manufacture of fire-arms and ordnance."

An alloy, consisting of 90 parts of copper and 10 parts of aluminium is used for cannon, it "forges and rolls when heated

"precisely like iron and steel." For a barrel of a small arm a cylinder about two inches in diameter and a foot long, having a hole about $\frac{3}{4}$ inch in diameter, may be rolled out into a barrel. The tensile strength of the alloy is said to be that of gun metal about as 97 : 32.

[Printed, 4d. No Drawings.]

A.D. 1858, October 8.—N° 2246.

BIRCHLEY, EVAN.—"An improved construction of cartridge."

The powder end of the cartridge is made of two qualities of fabric, one weaker than the other, and cut into such shape and so pasted that when pressure is applied to the cartridge it will burst open and allow the powder to escape. The ball, when one is used, is placed half in the cartridge at the other end, and is removed by hand and loaded in the usual way.

[Printed, 6d. Drawing.]

A.D. 1858, October 12.—N° 2269.

SWINBURN, JOHN FIELD.—"Improvements in fire-arms."

Instead of using a loop and bolt for attaching double barrels to a stock one or more metal bands or clips are used. The two ends of the band are secured by a screw bolt, to prevent it from slipping, a recess is formed in the rib. The necessity of heating the barrels to enable the loop to be attached is obviated.

[Printed, 6d. Drawing.]

A.D. 1858, October 14.—N° 2288.

COWPER, CHARLES. — (*A communication from Gustavus Cuppers.*)—"Improvements in the manufacture of articles of hard "vulcanized india-rubber and gutta percha and similar gums."

To enable hardened gutta percha and india-rubber to be used for, among other articles, the "butt ends of muskets, rifles, and "other fire-arms," the gum is mixed with sulphur, and heated for from half-an-hour to three hours in a metal mould. The moulded article is then withdrawn from the mould, and where blisters or other imperfections appear it is coated with a solution of the gum, and is again subjected to heat in the mould, in which it is tightly compressed. The operation, if requisite, may be repeated until the article is completed.

[Printed, 4d. No Drawings.]

A.D. 1858, October 16.—N° 2310.

TREEBY, THOMAS WRIGHT GARDENER. — “An improvement in breech-loading fire-arms and cannon.”

The breech end of the barrel is closed by long screwed nuts or caps. When the gun is to be loaded the nut is unscrewed and drawn back, and the cartridge is put in, and then the nut is again screwed on the end of the barrel. A plunger works through the nut for pushing the cartridge into its place in the barrel.

[Printed, 102. Drawing.]

A.D. 1858, October 19.—N° 2329.

WHITWORTH, JOSEPH. — “Improvements in guns, gun-carriages, and ammunition.”

The gun is adjusted horizontally in its bearings by means of a lever acting on one of the trunnions. Discs or cakes of wax or tallow, or compounds of those or similar substances, are used as wads. The lubricating material may be made of a hollow shape, so as to allow the powder to be contained between two hollow wads, or the inside of the wad may be made of a soft lubricating substance coated outside with wax. Zinc, or tin, or other hard metal is used as a coating for soft metal projectiles by a method similar to that used in making lead pipes coated with tin.

[Printed, 62. Drawing.]

A.D. 1858, October 21.—N° 2353.

REDFORD, GEORGE.—(*Provisional protection only.*)—“A circular and self-acting cartridge pouch.”

The pouch or cartridge box is to be made of a circular form to fit the waist, and have rounded ends. Inside the pouch or cartridge box are to be fixed springs which press against the ends of the pouch or box, and also against the bullets held in it. As the bullets are withdrawn the springs elongate and push against the bullets that are left, so as to hold them securely.

[Printed, 62. Drawing.]

A.D. 1858, November 1.—N° 2436.

PALMER, WILLIAM.—“Improvements in fire-arms.”

Revolving or repeating fire-arms are made so as to cock and discharge with one pull of the trigger, a pause in the action being

allowed to enable aim to be taken. The trigger, by means of a slotted plate, cocks the piece and then "slides off a knife edge." The cock is prevented from descending by a "seer or hair trigger" that takes into a notch in the said cock, making a pause during which aim may be taken; on continuing to pull, the seer is removed and the hammer is allowed to fall.

[Printed, 8d. Drawing.]

A.D. 1858, November 2.—N° 2444.

LAVATER, MANUEL LEOPOLD JONAS.—(*Provisional protection only.*)—"Improvements in cartridges for military and other purposes."

It is proposed to make the cartridge case of sheet india-rubber, and the cap is fitted in a hole in the cartridge which forms a handle to enable the cap to be put on the nipple. The powder is allowed to escape by pressing and bursting the cartridge, the ball, when one is used, is placed in the barrel by hand in this way.

[Printed, 4d. No Drawings.]

A.D. 1858, November 3.—N° 2459.

BUSSE, FREDERICK BERNHARD.—(*A communication from Theodor Knauth.*)—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The barrel is to be "pivotted to the stock with a screw or bolt" passing through "a slot in a loop projecting from the under side of the barrel." The barrel has a "slight longitudinal movement," and oscillates vertically round the bolt. The charge is exploded by a needle passing through an orifice in the breech piece, and also in case of need by a cap upon a nipple. By a lever arrangement worked by the trigger guard the breech piece is withdrawn from its recess in the rear end of the barrel, which may then be moved up so as to receive the charge.

[Printed, 4d. No Drawings.]

A.D. 1858, November 4.—N° 2463.

EVELYN, GEORGE PALMER.—"The improvement of the form of the stocks of rifles, carabines, and other fire-arms."

An "under arm gun stock" is attached to the stock, so made that the "sole" may lie obliquely in respect of the shoulder, and

the "toe" pass under the arm pit. The "but" is wedged in laterally towards the toe," so that "the effect of the recoil is opposed obliquely by the shoulder and laterally by the pressure of the right arm against the wedge-shaped but."

[Printed, 4d. No Drawings.]

A.D. 1858, November 5.—N^o 2473.

TJÄDER, CARL JACOB.—(*Provisional protection only.*)—"Improvements in gun carriages and in apparatus for lessening recoil."

The trunnions of the gun are to be "placed in cast-iron blocks running in grooves;" before and behind each block is a spring, working against an upright attached to the carriage or its frame. Before and behind the carriage pivot are other springs. A double screw arrangement is to be used for elevating the gun. Springs are also attached to the breeching of ships' guns.

[Printed, 4d. No Drawings.]

A.D. 1858, November 5.—N^o 2478.

DAVEY, SIMON.—"Improvements in blasting powder."

Powder is made of 64 parts of nitrate of potash.

" " 16 " sulphur.

" " 12 " charcoal.

" " 8 " flour, bran, or starch,

or 63 parts of nitrate of soda with 15 parts of sulphur may be used.

The proportions may be further varied.

The ingredients may be mixed in a barrel by the rubbing action of leaden bullets.

The powder is kneaded with water and rolled into cakes, and cut into grains or passed through a perforated sieve.

[Printed, 4d. No Drawings.]

A.D. 1858, November 8.—N^o 2497.

HALE, WILLIAM.—"Improvements in rockets."

The patentee's rockets, which are made to rotate during flight by means of the escape of fire through "tangential apertures made in the rocket case" are made to have a more certain flight by "dispensing with the cast-iron plug or weight in

"the after part of the rocket," and placing the apertures for the escape of the fire "in a plane as near as possible to the centre of gravity of the rocket, between the bored part of the composition and that part towards the head which is left solid." To give greater stability to the rocket case a cast-iron piece is rivetted on to the case, and in one side of it are formed tangential apertures to give rotation, on the other side are apertures to give onward motion, by the escape of the fire through the respective apertures.

[Printed, *sd.* Drawing.]

A.D. 1858, November 15.—N° 2564.

ARMSTRONG, WILLIAM GEORGE.—"Improvements in the manufacture of ordnance."

A Provisional Specification was deposited on November 15, 1858, and a Complete Specification was filed May 14, 1859. A certificate of the Principal Secretary of State for the War Department was filed May 13, 1859, pursuant to 22 Victoria, cap. 13. certifying that the patentee had assigned to the Secretary of State for War all benefit in his invention, and that it was for "the benefit of the public service that the particulars of the invention and the manner in which the same is performed should be kept secret."

[Printed, *4d.* No Drawings.]

A.D. 1858, November 16.—N° 2577.

KNAUTH, THEODORE.—(*A communication.*)—(*Provisional protection only.*)—"Improvements in fire-arms and ordnance."

Inside the ordinary barrel of the piece an extra small tube is to be fixed in the breech in such a manner that it may contain a portion of the powder charge, the other portion lying round it. The inner tube communicates with the touch-hole and holds enough powder to overcome the "vis inertia of the projectile."

[Printed, *4d.* No Drawings.]

A.D. 1858, November 19.—N° 2619.

RAMSCAR, WILLIAM, and SCOTT, JOHN GRAY.—"Improvements in fire-arms."

The breech end of the barrel has a recess, and is closed with a "drop lid" or a "sliding lid," which is locked when in position.

Cartridges having a metallic capsule to ignite the charge are charged in the recess in the rear of the barrel.

[Printed, 10*d*. Drawing.]

A.D. 1858, November 20.—N^o 2631.

WARRY, ROBERT.—(*Provisional protection only*).—"Loading cannon at the breech."

The gun is to be cast solid and bored through. A conical cylindrical plug or tumbler is fastened to the left side of the gun. A hole is made in the plug and it is turned by a lever; a quarter turn will bring up the hollow side of the tumbler, which then forms and has all the resisting powers of the breech, or leaves the gun entirely open."

[Printed, 4*d*. No Drawings.]

A.D. 1858, November 20.—N^o 2633.

VASSEROT, CHARLES FRÉDÉRIC.—(*A communication from Peter Rector Smith*).—"Improvements in fire-arms and ordnance and in the projectiles to be used therewith."

The body of the gun is made of iron or steel; a case formed of a composition of 90 parts of copper, 9 parts of tin, and 1 part of lead is cast on the base, from breech to near the muzzle of "half the thickness of the diameter of the bore." Outside the case hoops of wrought iron are shrunk on in one or more layers; the breech hoop is screwed on to each layer. Guns are strengthened by boring them out, and "when the internal bore is well smoothed a steel cylinder is inserted; the external case may be heated when the internal cylinder is introduced. A touchhole with two holes is used." Instead of rifling grooves "directing pieces" are to be used.

[Printed, 8*d*. Drawing.]

A.D. 1858, November 24.—N^o 2664. (**)

SHAW, Sir CHARLES.—(*Provisional protection only*).—"Improvements in the construction of ball and bullet, proof shields, or mantlets."

The invention consists "in constructing mantlets or shields of alternate layers of wire netting or gauze, or metal cloth, or

“ metal rods or bars worked and tied together, and hair, leather, cotton waste, tow; or other fibrous material.

“ When for the protection of ships I arrange the metal bars, or other materials of which the shield is formed, in such manner that when not required for the purpose of defence, they may be readily removed and stowed in-board.”

[Printed, 4d. No Drawings.]

A.D. 1858, November 24.—N^o 2668.

PETERSON, CHARLES.—“ Improvements in the manufacture of paper cartridges and in paper applicable for waterproof purposes.”

A solution of soap is introduced into and mixed with the pulp intended to be made into paper for cartridge cases. Alum solution is then added and decomposes the soap and so forms a waterproof paper. The pulp so made may be formed into paper in sheets, or into cartridge cases of requisite form.

[Printed, 4d. No Drawings.]

A.D. 1858, December 3.—N^o 2762.

BAILEY, THOMAS.—“ A mechanical movement applicable to loading fire-arms and other purposes.”

Charges for breech-loading arms are introduced into the barrel by means of “ a toothed wheel or pinion upon a travelling centre working between guides, and also working between, and in gear with, a pair of racks, one of which is stationary, the centre of the wheel changing its position or travelling in the same plane with the guides, as the wheel works in the teeth of the racks, such centre not being fixed.” In loading the “ moving rack is connected to the rammer, the other rack being fixed, and an operating lever” is connected to the wheel which is “ free to travel in the guides, and thereby on its revolution in the racks to give a length of motion to the rammer equal to the distance passed over by the wheel in its compound rotating and rectilinear motion.”

[Printed, 10d. Drawing.]

A.D. 1858, December 4.—N^o 2778.

SMITH, ALFRED, TOWNSEND, JAMES, and WILLIAMS, EDWARD WALTER. — (*Provisional protection only.*) — “ An improvement or improvements in breech-loading fire-arms.”

The barrel of the breech-loading fire-arm moves in a vertical plane, and is to be secured by means of "a double incline or two inclines turning on an axis on the body of the fire-arm, the inclines being situated opposite to each other on the axis." The inclines engage in "two knuckles or staples" on the under side of the barrel. The fastening is to be effected by "the motion of a handle on the axis of the inclines."

[Printed, 4d. No Drawings.]

A.D. 1858, December 15.—N^o 2871.

NEWTON, ALFRED VINCENT.—(*A communication*).—"Improved machinery for manufacturing bullets."

A punch and set of dies are used "for pressing blanks or pieces of lead" approximately into the required form, in combination with "a revolving core," which serves to form a recess in the bullets and acts "as a mandril to revolve the bullets," while they are turned and finished. The latter operation is performed by a self-acting cutter. A centre piece confines the bullets "upon the revolving core during the turning operation," and then releases them and moves out of the way to enable the dies to act.

[Printed, 8d. Drawing.]

A.D. 1858, December 16.—N^o 2885.

EDGE, JOHN WILLIAM.—"A certain improvement in balls, bullets, or other projectiles to be employed in fire-arms or ordnance."

The base of the bullet is made hollow, and in the hollow recess is placed lubricating matter. Apertures are connected with the recess, and when the bullet is fired the force of the explosion drives out the lubricating matter.

[Printed, 6d. Drawing.]

A.D. 1858, December 17.—N^o 2896.

KERR, JAMES.—"Improvements in the construction of revolving fire-arms."

The ordinary gun lock cock and safety bolt is applied to revolving fire-arms. An extra "bent" is formed on the tumbler, and the lock is snapped and cocked by means of a lever attached

to the trigger, "which is kept in proper position by a hook formed "on its edge and a stud on the top of the tumbler." The chamber is rotated in the ordinary manner.

[Printed, 8d. Drawing.]

A.D. 1858, December 23.—N° 2938.

MAUDSLAY, JOSEPH.—(*Provisional protection only*).—"Improvements in the construction of ordnance and projectiles to be used therewith."

The gun is to have "a shifting breech," to which a "lateral motion is imparted," the breech chamber is to be made of "wrought iron or steel, while the remainder of the gun is to be "formed of cast metal." The shot is to have a feather, which takes into the rifling groove.

[Printed, 4d. No Drawings.]

A.D. 1858, December 30.—N° 2990.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from L. F. Devisme*).—"Improvements in revolving fire-arms."

The revolving breech piece employed "may be turned either "downward or to one side, or otherwise, about a hinge or joint, "either in conjunction with or separate from the barrel." The breech piece is fixed in its place when the chambers are charged, "by means of a rod passing through the breech piece" and engaging at the rear end by means of a screw. The cartridges may be withdrawn when required by a rod, which will, if necessary, force them all out at once.

[Printed, 6d. Drawing.]

A.D. 1858, December 31.—N° 3007. (* *)

JOHNSON, JOHN HENRY.—(*A communication from Monsieur Sudre*).—"Improvements in the manufacture or production and "casting of steel, and in the apparatus employed therein."

Cast steel in large masses, suitable for "casting articles of extreme size, such as large ordnance," is made by melting cast iron and iron ores in a reverberatory furnace.

The cast iron and iron ores, "the one acting upon the other by "re-action, produce steel." In the operation the steel is pro-

tected from the action of the flame and smoke by a supernatant layer of neutral or basic scoria.

Steel produced by cementation or otherwise may be treated in the furnace, being covered with the protecting layer of fused scoria.

The floor or hearth of the reverberatory furnace may be heated underneath by flues, so as to allow inferior fuel to be used.

Combustible gases may be introduced into the furnace.

A large intermediate vessel may be used for receiving steel from crucibles when large articles like ordnance are to be cast.

A Disclaimer of part of the Specification was filed on the 20th July 1865, and the claims were limited to the use of "a reverberatory furnace with a protective layer of slag or of a separate vessel or receiver of any kind heated to a high degree of temperature as an intermediate receptacle."

[Printed, 6d. Drawing.] [Disclaimer printed, 4d. No Drawings.]

1859.

A.D. 1859, January 3.—N° 28.

BALCHIN, EDMUND.—"An improved construction of projectile applicable to the whale fishery."

A hollow lance or pointed shell containing a bursting charge, which is ignited by a time fuse, is fired into the whale from an ordinary harpoon gun. The shell has a bayonet point, and is made to fit the bore only at its two ends. The shell or charged lance is fired at or about the same time that the harpoon with line attached is made to strike the whale.

[Printed, 6d. Drawing.]

A.D. 1859, January 13.—N° 114.

MANCEAUX, FRANÇOIS JULES, and VIEILLARD, EUGENE NAPOLEON.—"Improvements in breech-loading fire-arms and in cartridges."

In order to provide for the proper expulsion of the paper case of the cartridge, a moveable conical piece is fitted in the breech of the gun, so constructed that the gases of explosion may act behind the rear of the cartridge, and blow it out of the barrel.

In the cartridge between the projectile and the charge of powder, is placed "a disc or wad of cardboard, steeped in fat," of a diameter rather greater than the bore of the gun. Two holes are bored through the disc, and a fine wire is passed through them and round the rear end of the cartridge. The disc protects the projectile from the action of the fire of the explosion, cleans the barrel, and takes out all the paper case of the cartridge.

[Printed, 6d. Drawing.]

A.D. 1859, January 18.—N° 157.

JOHNSON, JOHN HENRY. — (*A communication from Jacques Louis Lemaire Daimé.*)—(*Provisional protection only.*)—"Improvements in air pistols and guns."

Air pistols and guns for toys are to be made with a moveable stock that may be unscrewed from the barrel to enable the air piston to be removed when required to be repaired. In some cases they may be made in the form of revolvers.

[Printed, 4d. No Drawings.]

A.D. 1859, January 22.—N° 207.

SHARPS, CHRISTIAN. — "Improvements in breech-loading repeating fire-arms."

The cartridges employed have the bullet attached at one end and the detonating powder at the other. The cartridges are placed in charge chambers, and are discharged by the action of a "projection formed on the striking portion of the hammer." "The chambers rotate," in such manner that the edge of each cartridge is struck in succession. A sliding "barrel block" is used having "two or more bores;" spring catches attached to the stock extract the spent cartridges. A lever connected with the trigger guard may be used for moving the barrel block. A catch is "hung loosely to the hammer," to prevent premature discharge of the piece. A hard "steel centre piece" is introduced into the end of the barrel block to form an "anvil or base to receive the blow" of the hammer.

[Printed, 8d. Drawing.]

A.D. 1859, January 26.—N° 236.

HAMMOND, ISAAC.—"Improvements in breech-loading fire-arms and in cartridges to be used therewith."

The cartridge contains its own charge and is fired by means of a "swivelled pin" working in a hole in the vertical part of the breech plate, and drawn back by a helical spring. A pin on the cock, or the tumbler of the cock, strikes the swivelled pin, which pushes forward the cartridge pin and explodes the charge. The spent cartridge is extracted by means of teeth, attached to a moveable "extractor plate," which hold the cartridge case when the barrel is turned down, and draw it out. A tumbler "of a semi-cylindrical form is passed through the stationary "breech plate," and is "actuated by a lever." When the barrel is turned down, the flat portion of the tumbler is "presented to "the bump" on the barrel, when the barrel is closed, the tumbler revolves "and the cylindrical portion takes into a recess in the "lump" and holds the barrel firmly in its place.

[Printed, 8d. Drawing.]

A.D. 1859, January 26.—No 242.

KERR, JAMES.—"Improvements in the construction of revolving fire-arms."

The barrel and upper strap are forged in one piece, the lower portion of the frame and lower strap are hinged to the barrel. The "upper strap drops into a recess made in the back portion "of the frame, and the two are held together by a screw" and by the cylinder rod. Rotatory motion is given to the charge chambers by means of a stud on the cock which works in right and left hand spiral grooves cut on the back part of the cylinder rod. "Spring checks" prevent the chamber from turning the reverse way; or a ratchet wheel is fixed, or teeth are formed on the "base of the chamber or cylinder," or are applied to the cylinder rod.

[Printed, 8d. Drawing.]

A.D. 1859, January 28.—No 259.

PRINCE, FREDERIC.—"A new breech-loading gun."

The cock is placed at the top or the side or under the lock, and a swivel or link is attached to it and also to "a wedge or block, "passing through a transverse slot in the barrel," which is drawn back to admit the cartridge through the transverse slot. The arm is self-priming; "on pulling back the trigger the fore part of

"the cock strikes the nipple," and the block is forced into the slot and closes the breech. A tube containing several caps or primers "runs up the fore end or side of the stock;" when the trigger is pulled the cock "forces the cap or primer on the nipple." When the hammer is recoiled a projection upon it draws off the exploded cap or primer. A ring of suitable metal is inserted in the breech to form a tight joint, or a wad is attached to the base of the cartridge for a similar purpose.

[Printed, 10d. Drawing.]

A.D. 1859, January 31.—N° 275.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading and other fire-arms."

The breech is to be closed by means of a plug having helical projections upon it which act against "lugs or projections inside the breech." By turning or partially turning the plug it is moved into or from the breech; or the plug is moved by a lever working in a slot in the breech. Instead of fixing the cock "on the tumbler shank as usual," it may be made to move "on a separate axis formed on the lock plate;" this arrangement enables "a longer and lower spring" than usual to be employed.

[Printed, 4d. No Drawings.]

A.D. 1859, February 1.—N° 286.

WALKER, MARY ANN, and WALKER, RICHARD.—(*Provisional protection only.*)—"Certain improvements in the manufacture of percussion caps and in the apparatus for effecting certain parts of the same."

The percussion cap is to be made "waterproof" by inserting in it a disc of waterproofed paper, which is pressed down upon the powder in a cup shape.

The discs are cut out by a series of self-acting punches, and are deposited in the caps by self-acting apparatus which moves along a series of caps.

The form of cap may be altered from that commonly used, so as to enable it to be inserted "in a part of the touchhole which is enlarged to receive it."

[Printed, 4d. No Drawings.]

A.D. 1859, February 2.—N^o 300.

COOPER, JOSEPH ROCK.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The barrel is to be made to turn upon an axis "on the face of the break-off and parallel to the axis of the barrel." The axis enters a hole formed in a knuckle on the side or under side of the barrel." By turning the barrel aside its breech end is exposed to receive the charge. A screw may be formed on the axis so as to force the barrel tightly against the breech plate.

[Printed, 4d. No Drawings.]

A.D. 1859, February 4.—N^o 323.

MABERLY, FREDERICK HERBERT.—"Improvements in obtaining spring power, and in its application to various purposes."

Box springs or other springs are used in connexion with fusees, "operated upon by levers and ratchets;" the ratchet apparatus is affixed by squares to the spindles of the fusees, so as to be moveable at pleasure, and the ratchets worked by the lever "operated upon by racks and pinions." A row of springs may be fixed upon one spindle, and a row of fusees upon another spindle. The spring power may be "aided by weight power." The power may be applied among other purposes to "the loading and unloading of guns."

[Printed, 4d. No Drawings.]

A.D. 1859, February 5.—N^o 336.

AYERST, THOMAS RUSSELL.—(*A communication from James Hunter Sears.*)—"Improvements in breach-loading guns and other fire-arms."

The breech is closed by a screwed plug which works in a "cross piece" or frame, which is mounted on a joint or hinge on "one side of the bore." The screwed plug is turned by a lever handle, and the rear end of the barrel is enlarged to receive the screwed end of the plug.

[Printed, 10d. Drawing.]

A.D. 1859, February 9.—N^o 367.

JOHNSON, JOHN HENRY.—(*A communication from William H. Bell.*)—"Improvements in fire-arms."

The arms are "self-priming," and the primers are flat wafers which "are contained within a metal shield or tubular case," fitted with a screw thread to attach it to "the magazine chamber" of the hammer." A plunger actuated by a helical spring urges the primers, as they are wanted, into the required position. A guard plate is fitted on the striking surface of the hammer, and a slide works between it and the bottom of the shield, and pushes the primer into its place ready for discharge. When the tube is emptied it is unscrewed and refilled.

[Printed, 8d. Drawing.]

A.D. 1859, February 9.—N° 372.

NEWTON, WILLIAM EDWARD—(*A communication from Gilbert Smith.*)—"Certain improvements in breech-loading fire-arms and "in cartridges to be used in such fire-arms."

The barrel is connected with the stock by a hinge and is fastened by a spring catch acting on the top of the barrel. The spring catch is released by the action of a pin which passes through the stock inside the trigger guard, and may be pressed upwards by the finger. The charge chamber is formed partly in the barrel and partly in the breech or breech piece, and is larger in bore than the barrel, so that a shoulder is formed which retains the cartridge in the required position. The joint of the chamber is near the middle, and the cartridge case is made of some impermeable and elastic material, such as india-rubber or gutta percha, which will expand laterally and form a tight joint.

[Printed, 8d. Drawing.]

A.D. 1859, February 12.—N° 402.

RAWBONE, WILLIAM GEORGE.—(*Provisional protection only.*)—"Improvements in fire-arms and ordnance."

An elongated breech chamber is to be used for receiving the powder charge; its bore is less than that of the barrel, so that a shoulder is formed against which the projectile is pushed when the piece is charged, and the powder is prevented from being crushed. The "bar which extends forward from the percussioning" is to be carried "the whole length of the breech chamber."

[Printed, 4d. No Drawings.]

A.D. 1859, February 12.—N° 406.

NEWTON, WILLIAM EDWARD.—(*A communication from James H. Merrill.*)—"Improvements in breech-loading fire-arms."

The breech end of the barrel communicates with a charging chamber into which the cartridge is introduced. The chamber is covered with a lid having a lever handle; connected with the lid is a sliding piston. When the lid is shut down it drives the piston forward and so pushes the cartridge into the barrel. The piston forms a plug which closes the breech end of the barrel, when it is pushed forward with the cartridge into the bore of the barrel.

[Printed, 6d. Drawing.]

A.D. 1859, February 21.—N° 471.

WILSON, THOMAS.—"Improvements in the manufacture and construction of ordnance."

The gun is built up of hollow cylinders or tubes of "annealed cast-iron, or other suitable metal or alloy," the larger tubes being "shrunk on" the smaller ones. The surface of the inner tubes may be fluted so that channels are formed in the gun, for "the circulation of air or water" in order to keep the gun cool. Breech-loading guns are made with a plug-breech which is screwed, "the screw being carried by a bow strap or frame jointed to the ordnance," so that they may be turned aside when the gun is being charged.

[Printed, 8d. Drawing.]

A.D. 1859, February 23.—N° 496.

RUSSELL, SAMUEL.—"An improvement in the manufacture of handles for tea and coffee pots, jugs, kettles, knives, daggers, and forks, or any other description of article to which handles are applied."

Handles for daggers, knives, or other articles, are made by placing rings of ivory, bone, papier mâché, or other materials upon a rod, and fastening them tightly by means of a screw, so that the whole forms a solid handle.

[Printed, 4d. No Drawings.]

A.D. 1859, February 28.—N° 535.

BROWN, RICHARD, and MILNE, WILLIAM.—(*Provisional protection only.*)—"Improvements in fire-arms."

A safety bolt or catch is to be applied to the lock, so as to prevent the hammer from falling upon the nipple except when the safety bolt is released. This is effected by means of a cap which slides in the butt end of the stock, and also a catch which at the same time is pressed by the hand grasping the stock. The double action operates to release the safety bolt.

[Printed, 4d. No Drawings.]

A.D. 1859, March 3.—N° 564.

WILSON, THOMAS.—(*Provisional protection only.*)—"An improvement or improvements in breech-loading fire-arms."

A charging chamber is to be formed in the breech end of the gun, which is closed by a sliding plug, working in connection with a hinged lid or cover. A "screw bolt passes through the "extreme end of the breech," and presses on the end of the sliding plug and fixes it in its place.

[Printed, 4d. No Drawings.]

A.D. 1859, March 3.—N° 566.

DOUGALL, JAMES DALZIEL.—"Improvements in fire-arms."

A conical "projecting piece" of metal is formed in or attached to the breech end of the barrel. The powder charge lies round the "projecting piece," which has a channel formed in it communicating with the nipple or touchhole of the piece. The flame of the cap or percussion powder is communicated to the front part of the powder charge.

[Printed 8d. Drawing.]

A.D. 1859, March 4.—N° 573.

DENNET, CHARLES FREDERICK.—"Improvements in bayonets."

Bayonets are formed of "a lozenge, rhomboidal, elliptic, or other suitable section." They are so fixed "that the narrow or sharp edge is coincident with the longitudinal axis of the arm instead of the flat surface presented by the old form of bayonet."

[Printed, 8d. Drawing.]

A.D. 1859, March 9.—N° 611.

ARMSTRONG, Sir WILLIAM GEORGE.—(*Provisional protection only.*)—"Improvements in rifled ordnance and its projectiles."

In order to give a projectile the sufficient amount of windage on entering the piece, and to make it fit the barrel with sufficient tightness on coming out, "the projectile is fitted with fillets or "projections of soft metal," which enter the barrel "by one "track and leave it by another." The operation of shunting the projectile makes it "free and easy to move" during loading, and gives "steadiness" when the projectile is discharged.

[Printed, 4d. No Drawings.]

A.D. 1859, March 10.—N° 620.

MARTIN, JOHN COWDERY.—(*Provisional protection only.*)—"An improvement in the manufacture of cannon and small fire-arms, and of projectiles to be used with the same."

The barrel is made to load at the breech, and a compound projectile is to be used, such as iron coated with lead. The projectile is placed in a chamber slightly larger than the grooved bore of the piece, and when it is driven forward the lead coating is forced into the grooves so as to take the rifling.

[Printed, 4d. No Drawings.]

A.D. 1859, March 11.—N° 624.

BURTON, JAMES HENRY.—(*Provisional protection only.*)—"An improvement in breech-loading fire-arms."

The breech of the piece is to be closed by a plug having a steel end separated from the main portion of the plug by a ring or cylinder of copper. A ring of soft metal is thereby interposed between two hardened surfaces, and the breech plug forms a tight joint.

[Printed, 4d. No Drawings.]

A.D. 1859, March 11.—N° 625.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—"Improvements in casting mortars and cannon."

The mould in which the piece is cast is to be made "to revolve, "either during the time that the metal is being poured into it or "afterwards, until it has become partly or entirely solidified." The trunnions may be cast separately, and be afterwards shrunk on the piece. The metal may be introduced into the centre of the mould from below or from above.

[Printed, 4d. No Drawings.]

A.D. 1859, March 16.—N° 662.

AMBLER, HENRY.—“Improvements in breech-loading ordnance and in the means of producing part or parts thereof, which improvements are also applicable to what are called side arms.”

The charge chamber is formed in a breech piece of a spherical shape, which turns in a frame attached by side pieces to the barrel of the piece. When the piece is to be charged the spherical breech piece is turned round in its frame to receive the charge; it is then again turned so as to make the chamber concentric with the bore, and is then fixed by a screw.

[Printed, 10d. Drawing.]

A.D. 1859, March 18.—N° 685.

ARMSTRONG, Sir WILLIAM GEORGE.—(*Provisional protection only.*)—“Improvements in the means of igniting explosive projectiles.”

The improvements are stated to relate to those described in the Specification of former Letters Patent dated April 10, 1858, N° 779, and have for their object “the causing a shell or projectile to be ignited and exploded on striking an object sideways or otherwise than endways. The striker is fixed on a bolt, which is withdrawn by the shock the projectile receives on the firing of the gun, and being so withdrawn is at liberty to move to one side when the shell or projectile is checked in its flight by striking sideways against an object; the effect of which motion is to break or crush the receptacle of the detonating composition, and to fire or ignite the charge in the shell or projectile falling on its side, or striking with its side instead of its end, against an object.”

[Printed, 4d. No Drawings.]

A.D. 1859, March 22.—N° 725.

MAYNARD, EDWARD.—“Improving breech-loading fire-arms.”

The barrel turns on a hinge joint formed by a hooked piece projecting below its breech end. It is loaded by inserting in the breech end a metallic cup or chamber, containing the charge, and is removed by the thumb and finger. The metallic cup forms a tight joint; the trigger guard is used as a lever for fastening and releasing the barrel. A rod is attached below the barrel to give

the piece stiffness ; it may if required be used as a ramrod. A back-sight is mounted on the tang of the breech piece.

[Printed, 1s. Drawings.]

A.D. 1859, March 22.—N° 731.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Charles Rochaz.*)—"Improvements in fire-arms and ordnance, and " in projectiles and apparatus to be employed therewith."

"The breech end of the barrel is cut off "truly plane at right " angles to the axis, and a moveable breech piece attached by " screws to one arm of a lever fits accurately against it." The cartridges are sometimes made with fulminating priming, discharged by a needle. Sometimes fulminating powder is placed in a recess in the projectile, and acts in the place of a gunpowder charge. For ordnance the breech piece is made to slide up and down against the end of the barrel by means of rods and levers. Projectiles for rifled arms are furnished with "wooden projecting " plugs, either let partially into or passing entirely through the " projectile." When the gun is discharged its weight is sustained on legs, the wheels being raised off the ground. A cleaning rod is provided "with spring arms inclined in opposite directions," so as to clean out the bore and grooves.

[Printed, 8d. Drawing.]

A.D. 1859, March 25.—N° 757.

JOHNSON, JOHN HENRY.—(*A communication from Francis H. Bell.*)—"Improvements in fire-arms."

The improvements relate to those described in the Provisional Specification filed on February 9, 1859, N° 367, and "appertain " to self primers wherein the magazine is contained in the hammer " of the lock." The primers are of the flat or wafer kind, and a slide is used which "pushes forward individual primers into the " striking part of the hammer." The slide is either kept "over the " mouth of the magazine " or it may "be thrown in gear with the " lock plate, so that by cocking the hammer it will be acted upon " in such a manner as to force a primer from the magazine chamber " into the discharge chamber of the hammer on the descent of " the latter upon the nipple."

[Printed, 8d. Drawing.]

A.D. 1859, March 29.—N° 784.

MEEKINS, THOMAS MOSSOM.—(*Provisional protection refused.*)
—“The production of a motive power and of a projectile and
“explosive force to be used in instruments of war.”

Gases are proposed to be exploded by the agency of electricity inside a cylinder, into which they are introduced. The gases may be used “after the manner of air in an air-gun.”

The gases may be forced into a shell and exploded by an electric spark or other means.

[Printed, 4d. No Drawings.]

A.D. 1859, April 4.—N° 840.

BURTON, JAMES HENRY.—“Improvement in the manufacture
“of barrels for small fire-arms.”

The barrel is made of a taper form outside, and with a cylindrical bore by the action of grooved rollers. A cylindrical piece of steel or iron is bored, and then passed between rollers on whose peripheries are a series of grooves made of the requisite taper form. The cylinder is presented to the grooved rollers upon fixed mandrils, and the series of the grooves and mandrils may be graduated so as to roll the barrel to the required shape and bore.

[Printed, 4d. No Drawings.]

A.D. 1859, April 6.—N° 864.

SCOFFERN, JOHN.—“Improvements in lubricating projectiles
“and cartridges.”

A lubricating mixture is made by mixing paraffine with an equal weight of naphthaline. Another composition, which is preferred, is made by melting india-rubber and mixing it with four times its weight of paraffine and half its weight of naphthaline. The mixture, when required for use, is melted in a vessel, plunged in heated oil, and is kept at a temperature of about 240° F. The composition is applied to the projectile or cartridge in the usual manner.

[Printed, 4d. No Drawings.]

A.D. 1859, April 8.—N° 874.

SMITH, WILLIAM HENRY.—(*Provisional protection only.*)—"Improvements in the construction of cartridges, and in the fire-arm for using the same."

The cartridge is to be made in several compartments, in each of which powder or other explosive material is placed. The compartments are to be separated by discs, and the charges be fired in succession by means of a quick match. Successive impulses are to be given by these means to the projectile.

[Printed, 4d. No Drawings.]

A.D. 1859, April 16.—N° 965.

WALKER, WILLIAM.—(*A communication from Thomas Welcome Roys.*)—(*Provisional protection only.*)—"Improvements in rocket guns."

Rocket guns are to be made with their rear ends closed, and provision is made for the escape of the back fire, by forming openings in the top of the barrel of the gun. A jointed curtain is attached to the muzzle of the gun, which turns down on a hinge while aim is being taken, and rises as the rocket goes out of the barrel, thus preventing all inconvenience from back fire.

[Printed, 4d. No Drawings.]

A.D. 1859, April 18.—N° 968.

WARRY, ROBERT.—(*Provisional protection only.*)—"Improvements in breech-loading ordnance and its projectiles."

A "detachable breech" is to be attached to the barrel of the piece; it is to be "provided in the inside with a roller or stop, which by turning the aforesaid roller or stop about a quarter round the cartridge is cut, the breech hole is closed, the nipple is primed, and the piece of ordnance or cannon is fired."

Projectiles that require to be coated with soft metal have an outside screw formed upon their peripheries, so as to receive and firmly hold the coating metal.

[Printed, 4d. No Drawings.]

A.D. 1859, April 19.—N° 984.

GOSLING, WILLIAM.—(*Provisional protection only.*)—"Improving rifle-cannon and projectiles."

It is proposed to dispense with the portable breech piece used in the guns of Sir W. Armstrong, and to "secure" the piece by giving a quarter turn to a screw breech piece. Instead of using a sponge, projectiles packed with tow are employed, so that the gun is cleaned at each discharge.

A moveable platform is to be hinged to the trail of the gun to form "a traverse for the slide and screw."

[Printed, 4d. No Drawings.]

A.D. 1859, April 19.—N^o 991.

NEWTON, ALFRED VINCENT.—(*A communication from John Pender.*)—"Improved machinery for weaving seamless bags or other articles with hemispherical or regular or irregular ends or forms."

Cartridge bags of a cylindrical or conical shape are made without seam, by weaving them in a loom, having "jacquard harness" in combination with "a tapering reed, which narrows from top to bottom, between the wires of which, the threads or yarns of the warp pass. The reed is held stationary while the straight portion of the bag is being woven, and gradually lowered when the tapering conical shape is desired to be given to the bag, the fullness, when the bags begins to taper, being obtained by passing the shuttle with its filling through that portion of the warp or the shed where the fullness is desired, on the same principle as in ordinary weaving."

[Printed, 1s. Drawings.]

A.D. 1859, May 5.—N^o 1132.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from John Webster Cochran.*)—"Improvements in cannon and other fire-arms, and in projectiles, wads, and cartridges to be used therewith."

The projectiles used are covered with vulcanised gutta percha or india-rubber, or soft wire cloth or other soft covering to prevent the leading of the barrel. A wad or ring of gutta percha, or other elastic substance, is attached to the rear of the projectile, "for the purpose of imparting the rifle twisting action to the ball by the powder forcing it into the rifling." This is "of importance for cannon where iron shot is used."

Cartridges are made of wire cloth or perforated metal plates dipped into gutta percha.

[Printed, 4d. No Drawings.]

A.D. 1859, May 9.—N° 1161.

BUSSEY, GEORGE GIBSON.—“An improved contrivance for carrying cartridges and to facilitate using them.”

The Complete Specification filed with the application for Letters Patent, describes an endless band made of leather or other suitable material, to which are affixed a series of spring holders for holding cartridges. The endless band works on “two axes,” revolving between “two stiff frames,” which form “the sides of the outer case or cover,” which contains the band. Instead of an endless band a drum or roller may be used revolving on a centre axle and carrying the spring holders.

[Printed, 4d. No Drawings.]

A.D. 1859, May 10.—N° 1167.

NUTHALL, WILLIAM FROST.—“Improvements in ordnance and fire-arms, and in projectiles to be used therewith.”

The grooves of rifled bores are so formed that the bands are rounded off into the grooves,” making a “series of convex and concave curves.” From the cylindrical surface of the ordinary conical projectile the metal is removed, excepting “at the base and spring of the cone,” where sufficient metal is left to provide for the bearing of the projectile.

[Printed, 6d. Drawing.]

A.D. 1859, May 10.—N° 1175.

KEILLER, WEDDERSPOON.—(*Provisional protection only.*)—“Improvements in cartridges for guns or small fire-arms.”

The cartridge is to be made “with a percussion cap inserted and fastened to the end of it, so that by the action of placing the cap on the nipple of the gun the powder is liberated.” The cartridge is to be made tapered or cone shaped when required.

[Printed, 4d. No Drawings.]

A.D. 1859, May 11.—N° 1185.

SPENCE, WILLIAM.—(*A communication from John Rider.*)—“Improvements in knapsacks and other military equipments.”

A sheet or sheets of gutta percha or other similar material are provided with buttons and button holes, or other means of attachment, so that the separate sheets can be readily joined together to form the side or roof of a tent, or be spread upon the floor to form a bed. Straps and buckles are attached to the sheets in such a manner that they will, when folded, form a knapsack, or valise, or sack, with overlapping edges.

[Printed, 8d. Drawing.]

A.D. 1859, May 14.—N° 1210.

SMITH, DAVID. — (*Provisional protection only.*) — “Improve-
“ ments in projectiles for fire-arms.”

The projectile is to be made with two external chambers, the rear one being filled with gunpowder or detonating powder, the front one with phosphorus and flour sulphur, or sulphuric or other acid, or nails, glass, or other matters. Fuses are to be employed for igniting the charges. Spring feathers may be attached to the projectile, which lie in recesses while the projectile is in the barrel, and expand during flight so as to guide the projectile and give it rotation.

[Printed, 4d. No Drawings.]

A.D. 1859, May 17.—N° 1226.

DE TRETZ, AMÉDÉE ETIENNE CHARLES JOSEPH REYNAUD. —
“An improved composition for splitting rock.”

An explosive compound suitable for blasting operations is made by combining 52·5 parts of nitrate of soda, 27·5 parts of spent tan, and 20 parts of sulphur. The nitrate of soda is dissolved in water and boiled, the tan is then mixed in the solution and then the sulphur. The composition, when the ingredients are well mixed, is removed and then dried and enclosed in casks or bags ready for use.

[Printed, 4d. No Drawings.]

A.D. 1859, May 18.—N° 1231.

CHARLESWORTH, EDWARD. — “Counteracting the recoil of
“ small fire-arms and lessening the risk of injury arising from
“ bursting of the same.”

A handle called a "safety elevator" is attached to the barrel of a fire-arm at right angles to its axis, and at such a distance from the breech end of the barrel that it may be conveniently held in the left hand. At the breech end of the barrel is another curved handle, so shaped as to be conveniently grasped or held by the right hand. The hammer for discharging the gun may be underneath the barrel. In some cases the "elevator" handle for the left hand is attached to guns which are stocked so as to be fired from the shoulder in the usual way.

[Printed, 8d. Drawing.]

A.D. 1859, May 21.—N° 1255.

NEWTON, ALFRED VINCENT.—(*A communication from T. F. Henderson.*)—(*Provisional protection only.*)—"An improved construction of cartridge."

The cartridge case is to be made of a material that is waterproof and also inflammable. Paper or cotton or other fabric is steeped in a "compound of purified nitrate of potassa and sulphuric acid" to make it inflammable. It is then varnished on one side with gum shellac dissolved in alcohol, to which is added purified coal oil to render the substance pliable.

[Printed, 4d. No Drawings.]

A.D. 1859, May 25.—N° 1295.

NEWTON, ALFRED VINCENT.—(*A communication from Charles Bartholomew Allen.*)—"Improved machinery applicable to the manufacture of rivets, bullets, and other like articles."

Rods are made into bullets and other articles by means of "rolling pressure." A set of three mould wheels having the counterpart figure (in cross section) of the article to be formed, are mounted on the extremities of horizontal axles, which turn in suitable bearings, and are driven by spur gearing. Self-acting motions are employed for feeding in the rod, cutting off a part, and giving it the required pressure in the wheel moulds to form it into a bullet.

[Printed, 1s. 2d. Drawings.]

A.D. 1859, May 28.—N° 1318.

WILSON, THOMAS.—"Improvements in breech-loading fire-arms and ordnance."

An opening is made in the top part of the barrel to allow of the cartridge being inserted. The breech is closed by a sliding plug, which is drawn back to the rear of the opening to admit the charge, and is then pushed forward in front of the opening and so closes the breech end of the barrel. The sliding plug is fixed in its place during discharge by means of a bolt, or by means of "snugs," which fit into cross grooves.

[Printed, 8d. Drawing.]

A.D. 1859, May 28.—N° 1322.

OLDBURY, JOSEPH.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, applicable to pistols, muskets, carbines, and birding or other guns."

The charge is to be inserted in a charge chamber made to revolve upon a pin at the open breech end of the barrel. The charge chamber has a conical mouth which fits a recess in the rear end of the barrel; it has a sliding as well as a rotatory motion on the pin. When the cartridge is to be placed in the charge chamber the revolving breech piece is turned round so as to expose the chamber; it is then turned back, and is pushed up against the breech of the barrel, and is fastened by a wedge piece.

[Printed, 4d. No Drawings.]

A.D. 1859, May 31.—N° 1340.

COCKINGS, JAMES SEPTIMUS.—"Certain improvements in the construction of self-adjusting cases for holding and carrying cartridges of various sizes or gauges, parts of which improvements are also applicable to cartridge carriers now in use." The cartridge carrier is made by forming the back part the carrier or case of "one piece of sheet tin or other metal, transversely curved to fit the waist, while the angular lower part is intended to fit over the hip. The cartridges may be held in a vertical or in a horizontal position by means of flaps of india-rubber, held down by angle plates secured to the ends and middle parting piece of the carrier or case. The front flap of the case is fastened down by an elastic tab." The forms of the cartridge carrier may be variously modified.

[Printed, 1s. Drawing.]

A.D. 1859, May 31.—N° 1346.

LUNDY, JOHN JAMES.—“Improvements in cartridges and gun
“ wads for facilitating the loading and lubricating of fire-arms.”

Instead of using the ordinary grease or other similar lubrication for cartridges or projectiles, such substances as French chalk, or talc, or soapstones, or plumbago are proposed to be employed. The substances are either applied to the cartridges or projectiles in the form of dust, or are applied in combination with grease or varnish.

[Printed, 4d. No Drawings.]

A.D. 1859, June 2.—N° 1359.

WHITBY, TIMOTHY, and DEMPSEY, WILLIAM.—(*Provisional protection only*).—“Improvements in and applicable to ordnance
“ and fire-arms, and in the projectiles to be used therewith.”

A recess is to be formed in the interior of the gun at the breech end, and a packing or washer is to be fitted into the recess “for the
“ purpose of adding impetus to the projectile, and avoiding the
“ recoil of the gun. Projectiles are to be made with “a tail or
“ shaft on which is placed the charge of powder and elastic pack-
“ ing.” A passage is to be formed “longitudinally through the
“ breech of the gun for the purpose of receiving the shaft.”

[Printed, 4d. No Drawings.]

A.D. 1859, June 8.—N° 1401.

ASHBY, JOHN EYRE.—(*Provisional protection only*).—“Im-
“ provements in sights for fire-arms.”

The sight is proposed to be attached to a “toothed quadrant
“ or rack at the bottom of a pivotted lever arm,” into which a
spring ratchet tooth or pall is made to take, and from which
the pall is disengaged by a thumb piece. The notches or
teeth in the rack are made to correspond to the position in
which it is desired to fix the sight for given distances re-
spectively. The ear independently of the eye will enable the
marksman to know when his sight is fixed in the required
position.

[Printed, 4d. No Drawings.]

A.D. 1859, June 11.—N° 1419.

NEWTON, ALFRED VINCENT.—(*A communication from Charles Theodore Pierson.*)—"An improvement in fire-arms."

In order to protect "the detonating, powder of primed fire-arms" from moisture and accidental discharge, the cone or nipple is "encompassed with a cup," and a collar fitted with india-rubber or other packing is attached to the hammer. The collar and packing are so arranged as to be capable of adjustment as required.

[Printed, 6d. Drawing.]

A.D. 1859, June 16.—N° 1455.

HARMER, JOHN, and PARSONS, WILLIAM. — (*Provisional protection only.*)—"Improvements in fire-arms."

A continuous sheet of priming patches is proposed to be used. The hammer of the gun is made hollow, or with a longitudinal groove, and a flat strip of metal having fulminating powder attached to its under surface is inserted in the hammer, and a piece is pushed forward, deposited on the nipple, and cut off at each discharge. The strip has jagged edges which are pushed forward by "a small bolt" which works in a slanting hole in the hammer. When the hammer is cocked the end of the bolt is made to come against a fixed stop, which forces the bolt up and pushes the strip forward, and a portion is cut off by a knife edge formed on the nipple.

[Printed, 4d. No Drawings.]

A.D. 1859, June 18.—N° 1469.

JEFFERY, ALFRED.—(*Letters Patent void for want of Final Specification.*)—"An improved mode of giving rotary motion "to projectiles fired from rifled fire-arms."

Rotatory motion is to be given to the projectile by means of a "wad or wadding, composed of such a material and made of such "a shape as that the explosive force of the gun powder will "cause the sides of the wad to be pressed into the grooves of "the rifled fire-arm, and thus the wad or wadding acquires a "rotatory motion which it communicates to the projectile." The

AMMUNITION, AND ACCOUTREMENTS. 49

necessity of the projectile being "tightly grasped by the fire-arm" is thus avoided.

[Printed, 4d. No Drawings.]

A.D. 1859, June 21.—N° 1489.

GWYN, EDWARD.—(*A communication from Henry Gross.*)—"Improvements in breech-loading fire-arms."

The breech chamber is moved backwards and outwards by means of the trigger guard, which acts as a lever and is "connected at its inner end to a bed upon which the breech chamber is free to slide. On pressing the outward end of the trigger guard forward" it first "withdraws the mouth of the chamber free from the rear of the barrel; then on being pushed still forward it causes the bed to tilt" upwards, and raise the chamber to receive the charge. "On restoring the trigger guard to its position" it replaces the chamber, and pushes it into the rear end of the barrel and holds it in that position.

[Printed, 10d. Drawing.]

A.D. 1859, June 22.—N° 1503.

KUKLA, FRANCIS XAVIER.—(*Provisional protection only.*)—"Improvements in projectiles."

Hollow projectiles are to be made of a composition of antimony and tin. The projectile is made in two parts, which are to be soldered together and charged with explosive materials. The projectile is composed of a brittle metal strong enough to resist ordinary blows, but when fired against an object readily breaks up and explodes.

[Printed, 4d. No Drawings.]

A.D. 1859, June 22.—N° 1505.

MOORE, THOMAS.—(*Provisional protection only.*)—"Improvements in knapsacks and mess tins."

The knapsack is proposed to be "larger and narrower than usual," and 1 lb. 5 ozs. lighter than the ordinary soldier's knapsack. The mess tin is to be carried "in a compartment at the top of the knapsack, and over this the" articles required

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for general use; a flap "covers in the whole of these articles, and serves as a hold-all."

[Printed, 4d. No Drawings.]

A.D. 1859, June 25.—N° 1530.

RUSSELL, SAMUEL.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, and in projectiles to be used therewith."

The breech chambers are to be formed in a row in a sliding piece, which is inserted in an opening in the rear end of the barrel. As each chamber is discharged the barrel, which is engaged and disengaged by a screw motion, is freed the sliding breech piece, and is pushed forward, and another chamber is connected with the barrel. When all the chambers are discharged the breech piece is taken out, and another ready charged is to be put in its place.

[Printed, 4d. No Drawings.]

A.D. 1859, June 27.—N° 1535.

BURTON, BETHEL.—"Improvements in breech-loading fire-arms."

The breech is closed by means of a "sliding breech pin" combined with a sliding and turning sectional screw plug, constructed in such a manner that the parts must be brought properly to place before the screw can be turned to confine the breech pin to the barrel." To insure a tight joint the front end of the breech pin is made with a recess, which receives "a ring cup," the edges of which enter within the rear end of the barrel. The ring cup is made of aluminium, platinum, or some non-corrodible metal, and is fastened by a plug. A ring "occupies a recess at the rear end of the barrel," and makes a tight joint.

[Printed, 6d. Drawing.]

A.D. 1859, June 27.—N° 1536.

SMITH, GILBERT.—(*Provisional protection only.*)—"An improved construction of primer for fire-arms."

An annular piece or wheel is to be attached to the hammer, and in its periphery are formed several recesses or chambers, in

each of which is to be placed a cap on other primer. The wheel piece is to be turned by hand, and when the hammer falls a primer is brought down upon the head of the nipple and discharges the piece. The wheel piece, when all its primers are discharged, may be removed and be replaced by another ready charged.

[Printed, 4d. No Drawings.]

A.D. 1859, July 1.—N° 1573.

FISHER, SAMUEL. — "Improvements in ordnance and projectiles."

The gun is formed of rings or hollow cylinders built up or connected together. The inner rings or cylinders, which are made of steel, have a screw thread formed on the periphery of each, a corresponding thread being formed inside the outer rings, which are made of iron. The outer rings are screwed on the inner ones, so as to cover their joints and hold them together. The rings or cylinders are either forged or cast.

The gun may be made a muzzle-loader by screwing in a fixed breech, or a breech-loader by using a screwed plug breech, working in a hinged collar. The projectile is cylindrical, with a conical point, fluted in a spiral direction with the view of giving rotation by means of the resisting action of the air. The middle part of the projectile is made smaller than the ends, and is surrounded with packing that fits the bore of the gun tightly.

[Printed, 8d. Drawing.]

A.D. 1859, July 2.—N° 1580.

HART, THOMAS JAMES. — "Improvements in breech-loading fire-arms."

A slot or opening is made in the breech end of the barrel, and on the outside of it is fitted a tube which turns on the barrel and has a slot or opening corresponding with that of the barrel. By turning the tube round the opening in the barrel is uncovered so as to admit the cartridge. A sliding plug is fitted in the breech end of the barrel, having a conical front. When the piece is charged the sliding plug is pushed up into the barrel, and is made to engage by means of pins, and so form a tight breech.

[Printed, 10d. Drawings.]

A.D. 1859, July 7.—N° 1612.

LE MAT, FRANÇOIS ALEXANDRE.—(*Provisional protection only.*)
—“Improvements applicable to ordnance.”

In order to stop the vent of the gun while it is being charged a plug is attached to the discharging hammer. When the hammer is drawn back the plug is brought over and made to stop the vent, being kept down by means of a wedge-shaped piece or incline attached to the gun.

[Printed, 4d. No Drawings.]

A.D. 1859, July 8.—N° 1622.

LE MAT, FRANÇOIS ALEXANDRE.—“Improvements in the construction of revolving or repeating fire-arms.”

The charge chambers are formed in a rotating breech cylinder, which is made to turn upon a hollow spindle acting as a central barrel. The central barrel is to be charged by preference with several small bullets or with small shot. The hammer has a moveable head, so that it may be made to strike either upon the nipples of the outer series of barrels, or upon that of the central barrel. A sliding rammer is attached to the side of the barrel for loading the outer series of barrels, and a jointed rammer is used for loading the central barrel.

[Printed, 10d. Drawing.]

A.D. 1859, July 13.—N° 1658.

COOPER, ALLAN.—“Improvements in the manufacture of the grips of swords and sword bayonets.”

The grips of swords or sword bayonets are made by cementing strips or layers of leather together, and passing them between rollers to give them a suitable shape. The partially formed strips are, when dried, passed through a varnish or waterproofing composition, and are finished by pressing them in heated dies and by subsequently varnishing them.

[Printed, 4d. No Drawings.]

A.D. 1859, July 14.—N° 1664.

MUSHET, ROBERT.—“Improvements in the manufacture of shot and shell and other projectiles.”

Projectiles for ordnance and small arms are made "from a metallic compound or alloy of tungsten and iron, or of tungsten, manganese, and iron, or of compounds consisting essentially of these alloys." Moulds similar to those used in casting iron projectiles are used. The alloy is procured by "smelting wolfram or other compounds of tungsten mixed with iron ore" with charcoal or coke in a blast furnace. "Deoxidised wolfram" may be melted with cast or scrap iron in a blast furnace.

[Printed, 4d. No Drawings.]

A.D. 1859, July 14.—N° 1666.

ATKINSON, JOSEPH.—"Improvements in fire-arms."

A lateral sliding safety bolt or a pair of bolts is applied in combination with an "ordinary safety guard" to gun locks. The bolt or bolts are made to act in the false breech of the gun. When the gun is raised to the shoulder the pressure of the fingers acts upon the safety bolts, and causes them to move out the way of the hammer or hammers; at other times the bolts are interposed and prevent the hammer or hammers from striking the nipple though the trigger be pulled.

[Printed, 8d. Drawing.]

A.D. 1859, July 15.—N° 1679.

PRINCE, FREDERIC.—(*Provisional protection only*).—"An improvement in breech-loading fire-arms."

In order to enable chambered breech-loaders to be charged from the muzzle when required, a conical plug is to be used to close the open breech. In the centre of the plug is fixed a pin that projects entirely through the chambered part of the barrel, and fills up the chamber to the required extent in such manner that a projectile of the size of the bore may be used, and when it is charged it will not be forced down into the enlarged chamber.

[Printed, 4d. No Drawings.]

A.D. 1859, July 20.—N° 1703.

ERSKINE, JAMES.—"Improvements in breech-loading fire-arms."

The barrels are jointed "by a slotted joint to a sole of iron" connected to the stock and forming part of the false breech. The

sole of iron is formed round to receive the barrels in the round, and also admits "the bar action or forehand lock." The barrels are moved to and from the false breech by means of a lever working up and down upon a joint in the sole, one end of it being formed with notches which work in corresponding notches formed on the under side of the barrels, or the barrels may be moved by a horizontal lever working an eccentric or cam between studs attached to the barrel. Recesses are made in the faces of the hammers to receive and hold the pin of the pin cartridge, and draw it out when the barrels are pushed forward to be recharged.

[Printed, 1s. 2d. Drawings.]

A.D. 1859, July 25.—N° 1727.

AMBLER, HENRY.—(*Provisional protection only.*)—"Improvements in explosive projectiles."

The projectile is to be made in compartments, each charged with powder. When it strikes an object the powder in the front compartment is to be exploded by means of a cap, and successive explosions of the powder in the other compartments are to be effected by means of fuses communicating by suitable channels. The front part of the projectile is to be made heavy by putting lead upon it, and a tail of wood provided with expanding wings or feathers may be affixed to the rear end.

[Printed, 4d. No Drawings.]

A.D. 1859, July 29.—N° 1764.

NEWTON, ALFRED VINCENT.—(*A communication from John Walch.*)—"Certain improvements in that class of fire-arms known as revolvers and in bullets for the same."

The rotating breech chamber contains several chambers, each of which is made to receive a double charge fired by means of two nipples acted upon by two hammers. The bullet is formed in two parts, or has a recess formed in it which is filled with lubrication, so that when the bullet is rammed down the lubricating material is squeezed out.

[Printed, 10d. Drawing.]

A.D. 1859, July 30.—N° 1769.

FIRTH, THOMAS.—(*Provisional protection only.*)—"An improved breech-loading cannon."

The cannon is to be made with a horizontal slot in the breech end, in which a breech piece revolves "mounted on a strong vertical pin, and containing several chambers placed in a radial direction." When one of the chambers is brought in to a position concentric with the bore, a moveable collar working on the rear end of the barrel "is slidden partly over the mouth of the chamber, and thus makes the joint between the barrel and chamber perfect and secure."

[Printed, 4d. No Drawings.]

A.D. 1859, August 1.—N° 1776.

TREEBY, THOMAS WRIGHT GARDINER.—"Improvements in targets."

The target is divided into numerous small squares, each of which consists of a hinged flap. The flap on being hit moves and indicates where the bullet hits. The bullet after hitting and moving the flap strikes against the back of the target and falls down, so that all the bullets may be recovered.

[Printed, 6d. Drawing.]

A.D. 1859, August 8.—N° 1828.

JOHNSON, JOHN HENRY.—(*A communication from Silas and Pegot Ogier.*)—"An improved signal light and in apparatus employed in the production thereof."

Phosphuretted hydrogen gas is employed for signals and signal projectiles. The phosphuret is enclosed in a chamber into which water is admitted, so as to generate the gas. In some cases the phosphuret is enclosed in a hollow shot or shell which is divided into compartments. The shell is so arranged that when it is fired from a gun into the sea it will float, and water will be admitted into the compartment containing the phosphuret. Gas is then generated, which "burns at a mouth-piece while the shell floats on the surface of the water."

[Printed, 1s. Drawing.]

A.D. 1859, August 16.—N° 1890.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—"Improvements in wads for projectiles and in projectiles to be used therewith."

Wads intended to be used with elongated projectiles are to be made of a series of rings or discs enclosed in a metallic case or covering. The rings or discs are made of hemp, gutta percha, or any suitable elastic material. When the wad is fired it readily breaks up. The wad is to be attached to a recess formed on the rear end of the projectile.

[Printed, 4d. No Drawings.]

A.D. 1859, August 16.—N° 1891.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—
“Improvements in machinery or apparatus for rifling cannon.”

In rifling cannon it is proposed to employ self-acting machines for “turning or boring transversely, or planing longitudinally” three or more several rifle cuts or grooves within the interior of cannon, by causing the tool or cutter at each and every rotation (when cutting transversely), or traversing motion (when planing longitudinally) to act successively in or upon the three or more positions where the rifle cuts or curves are required, and observing this order continuously throughout “every portion of the length of the rifle cuts to be formed.”

[Printed, 4d. No Drawings.]

A.D. 1859, August 22.—N° 1918.

SPRATT, HENRY.—“Improvements in revolving pistols and other fire-arms.”

In order to enable revolvers to be discharged more rapidly moveable breech pieces are employed. When one set of chambers has been discharged, instead of reloading them the breech piece is disconnected from the stock, and another breech piece is put in its place ready charged. The breech piece is provided with a projection on its rear end which fits into a “recess made in the framework of the pistol behind the breech.” It is fastened by the central pin or bolt on which is formed an extension or thumb-piece to enable it to be readily withdrawn.

[Printed, 8d. Drawing.]

A.D. 1859, August 22.—N° 1921.

ABBOTT, EDWARD.—“Improvements in ordnance and fire-arms.”

The barrel of the gun is bored through, and a conically shaped

plug is inserted in a hole at the breech end at right angles to the bore. When the piece is to be charged the plug is removed and the charge is inserted in the open breech; the plug is then replaced and secured in its place by a key.

[Printed, 1s. Drawings.]

A.D. 1859, August 29.—N° 1959.

WHITWORTH, JOSEPH.—“Improvements in ordnance fire-arms and ammunition.”

Breech-loading guns are made with the breech end open; a screwed cap is used to close the breech end, and is screwed on or off the end of the barrel. In the case of ordnance, the cap works in a hoop hinged to the breech end of the gun. Cartridges for ordnance are made of thin metallic, or pulpy, or fibrous material, of a shape externally to correspond with the rifled bore of the gun. Cartridges for small arms are made of paper or other tubes closed at one end by a moveable slide or valve. When the piece is to be loaded the cartridge is placed on the muzzle of the gun, and the powder, the lubricating wad, and the projectile are all pushed through the cartridge case into the barrel by a single push of the ramrod.

[Printed, 8d. Drawing.]

A.D. 1859, August 31.—N° 1984.

MAC KENZIE, JAMES, and WENTWORTH, STEPHEN THOMAS.—“Improvements in breech-loading fire-arms.”

The breech chamber of the gun moves freely on axes or trunnions carried by the two sides of a slotted frame, which at its fore end is formed into a tube or socket, in which the barrel slides freely. A screwed collar is made to work with a right and left handed screw upon the rear end of the barrel, and fore end of the charge chamber; by turning the collar in one direction the barrel is forced tightly against the chamber, by turning it in the other direction the chamber is released, and may be turned upwards to receive the charge.

[Printed, 1s. 4d. Drawings.]

A.D. 1859, September 2.—N° 2010.

SPURGIN, JOHN.—(*Provisional protection only.*)—"Improvements in ordnance and projectiles."

A steel tube, rifled in its interior, is to be fitted into the bore of the gun, which may be an ordinary smooth bore. The steel tube is to be made moveable, and is withdrawn to receive its charge, and "then put back into its place and there locked."

[Printed, 4d. No Drawings.]

A.D. 1859, September 5.—N° 2025.

FIELD, JOHN WILLIAM PARKER.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The improvements are stated to relate to an "invention patented by A. V. Newton on April 1, 1857." The bolt which secures the breech of the piece is to be "shot forward by the action of a wedge-formed, inclined, or curved surface upon a slotted incline or curved surface made in the bolt, or otherwise connected with it."

A screw is to be introduced "at the under part of the chamber," and through "the breech into the interior of the chamber, so that its screw end may near to and over, but not touch, the external curved face of the tubular bolt valve," so as to hold the latter properly in its place.

[Printed, 4d. No Drawings.]

A.D. 1859, September 6.—N° 2033.

MANCEAUX, FRANÇOIS JULES.—"Improvements in cartridges."

Washers or wads saturated with lubricating materials are placed at the back of the bullet in cartridges intended for rifled or other fire-arms. A hole is made in the centre of the washer (which forms a seat for the bullet), so that the gases of explosion may act upon and expand the bullet. In some cases two concave washers or one plain and one concave wad are used.

[Printed, 8d. Drawing.]

A.D. 1859, September 7.—N^o 2040.

JONES, HENRY.—“Improvements in breech-loading fire-arms.”

The barrels turn down upon a hinge joint; on the under side of the barrel is “a block or blocks,” in or between which is a transverse opening. When the barrels are shut down the “blocks enter “the lower part of the body of the gun;” the inclined face of the block is forced against “a steel plate or cross piece in the “body of the gun,” which may be replaced when worn. The barrels are fastened in their place by lever bolts engaging in the transverse opening, and worked by a lever motion underneath the barrels. In order to cut off communication between the two barrels a rib may be inserted between their ends, so as to fit “in “a groove on the face of the body of the gun.” When the barrels are turned down they are made to exert pressure upon a spring or spring pieces, which re-act upon the joint, and “pre-serve it tight.”

[Printed, 10d. Drawings.]

A.D. 1859, September 10.—N^o 2066.

SMITH, ANDREW.—(*Provisional protection only*).—“Improvements in strengthening umbrella and walking-stick handles, “and other articles or details wherein the cross or transverse “grain of the wood or other material is subject to strains.”

Gun stocks may be strengthened in the weak part where the grain of the wood is cut across, “by the insertion of a dowel of “wood, or other material of straight or right line grain, into a “groove or bored hole in the side or centre of such weak part.”

[Printed, 4d. No Drawings.]

A.D. 1859, September 13.—N^o 2087.

GRAINGER, JOHN.—(*Provisional protection only*).—“Improvements in breech-loading fire-arms, and in moulds for making “projectiles.”

The barrel is to be connected to the break-off by two arms, to which it is jointed, so as to work in a vertical place. Through the face of the break-off a screw is protruded, which is made to engage in the rear of the barrel, being worked by a lever motion, which gives partial rotation to the screw. Moulds for casting

projectiles for hexagonal or polygonal rifles are to be made "of a single block of metal, in which is sunk a cavity, having the figure of the projectile, the base of the projectile being uppermost."

[Printed, 4d. No Drawings.]

A.D. 1859, September 14.—N° 2097.

SLOCUM, JOHN STANTON.—(*A communication from Charles Tillinghast James.*)—"Improvements in projectiles suitable for ordnance."

A packing ring or envelope formed of soft fibrous, or metallic or other substance, is attached to the rear end of the projectile. The gases of explosion acting upon the ring or envelope force it into the rifling grooves, and so give rotation to the projectile. The packing ring or envelope is so arranged as to become detached from the projectile as soon as it issues from the piece. "By this arrangement, the usual windage is destroyed," while the "clogging or lead-ding of the gun is prevented."

[Printed, 1s. Drawings.]

A.D. 1859, September 17.—N° 2120.

KERR, JOHN JAMES.—(*Provisional protection only.*)—"Improvements in the manufacture of cartridges containing shot."

For cartridges containing shot, "wads having one side of a concave form to cover the shot" are to be used, the concave side being next the shot. The wad is "strongest at its outer circumference," and may have a hole through it or not.

[Printed, 4d. No Drawings.]

A.D. 1859, September 20.—N° 2143.

NEWTON, WILLIAM EDWARD.—(*A communication from A. B. Stoughton.*)—(*Provisional protection only.*)—"Improvements in projectiles."

A band of copper or soft iron, or other metal, is to be attached to the body of the projectile, and is prevented from turning upon it by suitable projections. Openings or channels are made between the band and the projectile, so that the explosive gases may force the soft metal band into the rifling grooves. A percussion patch

or tube is to be inserted in the front of the projectile when it is intended to act as a shell.

[Printed, 4d. No Drawings.]

1859, September 24.—N° 2173.

OPIE, JOSEPH. — (*Provisional protection only.*) — “Improved instruments or apparatus for charging holes in blasting operations, parts of which are also applicable for like purposes.”

A tube of brass or other material is to be introduced into the hole intended to receive the powder charge. The fuse is introduced by means of a long grooved piston; the power is then introduced, covering the lower end of the fuse. Above the charge is placed a wad formed of rosin, tar, and pitch, with a coating of fibrous substance on the flat side. The ordinary tamping is then introduced.

[Printed, 4d. No Drawings.]

A.D. 1859, September 27.—N° 2188.

LEJEUNE-CHAUMONT PASCHAL J.—“Improvements in fire-arms and ordnance, and in projectiles and cartridges to be used therewith.”

The stock of the fire-arm is fitted with a flat metal plate or breech plate from which projects a screw, and this screw enters a hole tapped with a corresponding screw in a lump formed on the under side of the barrels.

By partially turning the barrel or barrels the rear end is exposed to receive the cartridge; by turning the barrel or barrels back they are forced up against the breech and make a tight joint.

In the case of ordnance the breech end of the cannon is made to turn on a screw attached underneath the piece. A modification of the ordinary “pin cartridge” is used. A projectile having a ring or belt of soft metal expanded by a wooden plug may be employed. An exploding projectile is made by forming the head of the projectile hollow, and filling it with an exploding composition. At the bottom of the hollow a nipple is fixed to receive a cap, and a plunger passes through the point of the projectile, which, when the shot strikes, is forced down upon the cap.

[Printed, 1s. 10d. Drawings.]

Wads intended to be used with elongated projectiles are to be made of a series of rings or discs enclosed in a metallic case or covering. The rings or discs are made of hemp, gutta percha, or any suitable elastic material. When the wad is fired it readily breaks up. The wad is to be attached to a recess formed on the rear end of the projectile.

[Printed, 4d. No Drawings.]

A.D. 1859, August 16.—N° 1891.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—"Improvements in machinery or apparatus for rifling cannon."

In rifling cannon it is proposed to employ self-acting machines for "turning or boring transversely, or planing longitudinally" three or more several rifle cuts or grooves within the interior of cannon, by causing the tool or cutter at each and every rotation (when cutting transversely), or traversing motion (when planing longitudinally) to act successively in or upon the three or more positions where the rifle cuts or curves are required, and observing this order continuously throughout "every portion of the length of the rifle cuts to be formed."

[Printed, 4d. No Drawings.]

A.D. 1859, August 22.—N° 1918.

SPRATT, HENRY.—"Improvements in revolving pistols and "other fire-arms."

In order to enable revolvers to be discharged more rapidly moveable breech pieces are employed. When one set of chambers has been discharged, instead of reloading them the breech piece is disconnected from the stock, and another breech piece is put in its place ready charged. The breech piece is provided with a projection on its rear end which fits into a "recess made in the framework of the pistol behind the breech." It is fastened by the central pin or bolt on which is formed an extension or thumb-piece to enable it to be readily withdrawn.

[Printed, 8d. Drawing.]

A.D. 1859, August 22.—N° 1921.

ABBOTT, EDWARD.—"Improvements in ordnance and fire-arms."

The barrel of the gun is bored through, and a conically shaped

A.D. 1859, October 6.—N° 2282.

WARRY, ROBERT.—(*Provisional protection only*).—"Improvements in breech-loading ordnance and in projectiles for the same."

A horizontal mortice or slot is to be formed in the breech-end of the gun, in which works a sliding block. Through the breech, and in a line with the bore, a screw is made to work. On the inner end of the screw are teeth which "take into a rack attached to a sliding block or carriage," giving it a transverse motion, and thereby conveying the cartridge into the charge chamber. The motion of the screw being continued forces the breech piece into the bore and closes it. Projectiles are formed with screwed surfaces round which are lapped fibrous materials to form soft packing.

[Printed, 4d. No Drawings.]

A.D. 1859, October 10.—N° 2298.

BENTLEY, JOSEPH, and SILLEM, HERMAN JAMES.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms and the machinery for manufacturing projectiles for small arms."

The breech end of the barrel is to be closed by a sliding plug, actuated by a folding covering piece, to which it is connected by a link, joint, or rod, and the covering piece may be fitted with a bolt or other fastening." The sliding plug may be moved by means of "a cam motion, which may be actuated by a small lever." Projectiles are made of a uniform density by using a self-acting press, which cuts off from a bar of lead a required portion, and presses it into the form of a bullet in a screw press.

[Printed, 4d. No Drawings.]

A.D. 1859, October 11.—N° 2311.

SMITH, JOHN.—"Improvements in breech-loading fire-arms and ordnance."

The breech is closed by a breech piece "hinged to the segment of a socket forming part of the back iron or solid breech con-

nected to the stock. A "sliding twitch hoop or tube" is used to fasten the breech by sliding the hoop "so that it is partly over the breech piece and partly over the barrel." A screwed pin may be used to close the breech, upon which is fitted a screwed "twitch tube."

[Printed, 10d. Drawing.]

A.D. 1859, October 15.—N° 2357.

BROWN, JOHN HARCOURT.—"Improvements in the preparation of gunpowder for loading ordnance and fire-arms."

Charges of gunpowder are prepared in a compressed solid form, by mixing with the grains of powder a solution of spirit and "gumaceous or adhesive" matter, and while they are in a slightly damp condition pressing them in a suitable mould. A suitable solution is made by dissolving one pound of gum arabic in two pounds of water, to which is added a quarter of a pound of nitrate of potash dissolved in five times its weight of water; to the mucilage so formed is added a pound of spirits of wine, and the mixture is well stirred until an uniform opaque fluid is formed.

[Printed, 4d. No Drawings.]

A.D. 1859, October 18.—N° 2375.

CANOUIL, GERMAIN.—(*Provisional protection only.*)—"Cartridge's paper chemically prepared for percussion fire-arms."

Cartridge paper is to be immersed in "a solution aqueuse of mineral salts." The paper so prepared will allow the fire from the cap to penetrate through the paper to the powder within it.

[Printed, 4d. No Drawings.]

A.D. 1859, October 20.—N° 2400.

HUGHES, EDWARD THOMAS.—(*A communication from Henri Mennig.*)—"Improvements in machinery or apparatus for compressing and making caps for cartridges."

Self-acting machinery is used for finishing and applying the metallic caps of breech-loading cartridges which contain their

own ignition. A perforated disc is made to move upon a vertical pin or stud; steel ferrules or bushes are placed in the holes or perforations to receive the cartridge tubes, which are formed by bringing each tube in contact with a matrix and pusher. The cartridge tube is prepared with its metallic cap, and the machine "performs the operations of impressing the name or device upon the bottom of the cap, compressing the body of the cap upon the cardboard of the tube, forming the edge, flange, or border, and also forming the hole for the explosive materials." A self-acting stop motion is attached to the machine which arrests the motion when a cartridge tube is not properly placed so as to be subjected to pressure.

[Printed, 10d. Drawing.]

A.D. 1859, October 20.—No 2405.

HANSON, CHARLES.—"Improvements in fire-arms and ordnance."

Breech-loaders are made with a "cone" breech piece "travelling in a box attached to the inside of a hinged or jointed cap, and shaped convex on the side next to a recess behind the barrel or charge chamber." The recess has a bevelled seat corresponding with the shoulder of the cone piece. A thumb piece is attached to the cone piece, and when the charge is inserted the thumb piece, which works "in a slot cut in an inclined direction across the cap," is pushed forward and closes the breech by a locking motion. The lock "consists of three limbs." The cock is "secured by a pin" to the lock plate; it has a shoulder at the back "on which the fore extremity of the main spring rests, being secured at the other end to the lock plate." The "sear and several other ordinary parts" are dispensed with. The cock "has a toe at the back corresponding with notches or bents cut in the blade of the trigger, which works in a reverse direction to what is usual, being centred at the opposite side of the blade." The barrel of a breech-loader may be made to slide away from the breech in a slotted carrier or frame. A "lever or locking piece" is attached to the barrel; by pulling down the lever the barrel is pushed forward, and by throwing back the lever the breech is closed and locked.

[Printed, 10d. Drawing.]

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A.D. 1859, October 25.—N° 2435.

CANOUIL, GERMAIN.—(*Provisional protection only.*)—"New machinery for priming percussion caps without danger of explosion, also a new fulminate not hitherto employed."

A fulminate for priming percussion caps is to be made by mixing chlorate of potash "with the prussiates, solubles or unsolubles, the hyposulphites, the hypophosphites, the phosphures, and amorphous phosphure alone or combined." These or other explosive compounds are to be reduced to a semi-fluid state, and applied to percussion caps by dipping simultaneously many steel pins in the semi-fluid compound and transferring it to the caps, which are to be afterwards dried.

[Printed, 4d. No Drawings.]

A.D. 1859, October 26.—N° 2450.

ARMOUR, JOHN.—"Improvements in apparatus for measuring and for regulating supplies of solid and fluid substances in the preparation of mixtures or compounds."

The improvements relate to self-acting mixing apparatus which may be used in manufacturing or mixing gunpowder or other materials which require to be mixed in fixed quantities. Compartments having revolving or sliding lids, and arranged in a series, are attached to the mixing mill. The pulverised materials are passed into and fill the compartments, and are drawn off as required and mixed in the mill.

[Printed, 10d. Drawing.]

A.D. 1859, October 26.—N° 2453.

WHITBY, TIMOTHY, and DEMPSEY, WILLIAM.—"Improvements in ordnance and fire-arms."

The improvements are said to consist "in applying a metal spring or springs to a moveable breech or piston within the barrel of a piece of ordnance or a fire-arm;" also in "the application of an air vessel or chamber in communication with the barrel of a piece of ordnance or a fire-arm." When the sliding breech is forced back against the spring a communication is opened between the air chamber and the interior of the barrel.

[Printed, 6d. Drawing.]

A.D. 1859, November 4.—N° 2517.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from John Webster Cochran.*)—"Improvements in breech-loading ordnance and other fire-arms, and in projectiles to be used therewith."

Breech-loading cannon, are made with a plug breech, which works on a hinge joint and is fixed by a screw or by lugs. The plug has a sliding motion in the breech piece, and its recoil acts upon a spring placed in the rear; it is also made to explode "an accelerating cartridge," whose gases are allowed access to the bore of the gun and add impetus to the started projectile. Lubricating matter is contained in grooves or chambers in the rear of the piece and a small portion is pressed out into the bore at each discharge. Jackets or rings of soft metal are fitted upon the projectiles, and suitable channels and holes are made in them to allow the gases of explosion to act inside the projectile and force the soft metal into the rifle grooves. Gunpowder is introduced into or under the soft metal ring, and its explosion expands it into the grooves. Percussion shells are provided with hollow glass capsules which break and explode when the projectile strikes an object. In some cases a sliding plunger is used which is attached by a spiral spring to the base of the shell. When the shell strikes the plunger moves forward and explodes a cap

[Printed, 1s. 2d. Drawings.]

A.D. 1859, November 14.—N° 2583.

DANIELL, HENRY JOHN.—"Improvements in the construction of breech-loading fire-arms."

An ordinary muzzle-loading gun is converted into a breech-loader "by turning down the screw in the barrel, by which it is secured in position," and forming a hinge joint on the barrel so that it may be jointed to the stock. The rear end of the barrel is raised to receive the cartridge. When pin cartridges are used a groove is cut in the barrel to receive the pin. When the barrel is charged and forced down into its place it is locked by a powerful bolt sliding in the stock in the place of the ramrod.

[Printed, 10d. Drawing.]

A.D. 1859, November 15.—N° 2585.

WARD, WILLIAM HENRY.—“An improved turntable for rail-ways and other purposes.”

The “turning platform of the table” is supported without the aid of a central pivot by means “of hollow spherical balls or “spherical treadwheels arranged between circular grooved tracks “of such a form in their cross section as to admit of freedom “for the said balls or wheels.” The table is turned by “a crank “shaft and gear wheel near the centre of the platform.” The ends of the timbers which support the tracks are supported by means of knee joints, which are “operated by means of a hand “lever near the crank shaft.” The turntables are applicable for turning the platforms of “mortar beds and pivot gun carriages,” and other purposes.

[Printed, 6d. Drawing.]

A.D. 1859, November 17.—N° 2610.

McKENZIE, JAMES, and WENTWORTH, STEPHEN THOMAS.—“Improvements in breech-loading fire-arms.”

The breech piece containing the charge chamber is made to “tilt up,” so that the cartridge can be inserted in it from the front. The breech piece is then shut down and its front part is pushed into a recess formed in the rear of the barrel, which is made to correspond to the front of the breech piece. A right and left handed screw, worked by a lever handle in the rear of the hammer, is used to fix and hold the charge chamber in its place. The cartridge is exploded by means of a cap placed on a nipple screwed into the breech piece.

[Printed, 1s. Drawings.]

A.D. 1859, November 23.—N° 2649.

HUGHES, EDWARD THOMAS.—(*A communication from Nicholas Rave the elder.*)—“Improvements in the manufacture of a certain substance to supersede blasting powder.”

A compound called “alkal-oxide” is produced “by saturation “by the disengagement of an acid gas from an alkaline solution “in contact with a vegetable and mineral substance.” About 80

parts of carbonate of potash, 30 parts of ground straw, and 15 parts of anthracite are "dissolved in a sufficient quantity of water to form a thin paste;" the mixture is worked in a "Woulf's machine" or other apparatus, and is kept at "a very moderate temperature." A current of acid gas, produced by heating peroxide of manganese and hydrochloric acid in a suitable bath, is made to pass through the mixture, which is kept from contact with atmospheric air. The mixture is then dried. Instead of straw and anthracite pulverised pit coal may be used. The substance may be used instead of blasting powder. It may be used when damp, and produces no "offensive smell or suffocating effects when fired."

[Printed, 4d. No Drawings.]

A.D. 1859, November 23.—N° 2651.

HUGHES, EDWARD THOMAS.—(*A communication from Nicholas Rave the elder.*)—"An improved chemical combination to supersede blasting powder."

A mixture called "oxygenic composition" is made "by reducing to powder, either separately or combined, chlorate of potash, carbonic acid (charcoal), adding a little water" and mixing in a mill to form a paste; or powdered coal or ground vegetable matters may be mixed in a solution of chlorate of potash dissolved in water. 100 parts of ground vegetable matters may be mixed with about 200 parts of chlorate of potash dissolved in water. The paste is dried and used instead of blasting powder.

[Printed, 4d. No Drawings.]

A.D. 1859, November 24.—N° 2657.

PRESTON, FRANCIS, and GARRETT, WILLIAM HENRY.—"Improvements in the construction of cartridges."

The bullet or shot and the wad and the powder are placed in an ordinary paper cartridge tube or case. The powder end of the cartridge is closed by gumming or tying it, and the closed end is connected with a ring or collar that fits upon the outside of the cartridge case. When the cartridge is inserted in the muzzle of the piece the end of the barrel presses back the ring or collar and so bursts open the powder end of the cartridge, the powder falls,

and the cartridge is then reversed to allow the bullet to be inserted with the wad.

[Printed, 8d. Drawing.]

A.D. 1859, December 3.—N° 2736.

HALL, THOMAS.—“Certain improvements in the construction of cartridges.”

The cartridge is made in the usual way by placing the ball or shot, and the wad and the powder, in an ordinary cartridge tube or case. The mouth of the cartridge case is closed by fitting in it a disc of cardboard or metal, which may be confined by pasting paper over it. When the cartridge is required for use it may be grasped in the hand and the disc is readily removed by the thumb nail. The powder may then be poured out and the bullet and wad be inserted in the usual way.

[Printed, 6d. Drawing.]

A.D. 1859, December 3.—N° 2742.

PARSONS, PERCEVAL MOSES.—(*Provisional protection only.*)—“Improvements in fire-arms and projectiles.”

A breech-loading gun is to be made with a plug breech fastened by a screw worked by a lever. A rifled barrel is to be made with a bore “of a section formed by three curved lines joined alternately by three other curved lines of a different radius or curvature from the three first, and meeting them at tangents; these, together form a circular figure slightly flattened at three points and slightly bulged at the three opposite points.” The projectile is to be made “more or less conical or pointed at both ends,” the fore part is to have the greater specific gravity. The heavy part of the bullet may be made of an alloy formed of 5 to 10 parts of antimony and 100 parts of lead.

[Printed, 4d. No Drawings.]

A.D. 1859, December 5.—N° 2753.

LANCASTER, ALFRED.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms, in projectiles, and in apparatus for charging cartridges for breech-loading and other arms.”

A breech-loading gun is to be made with its breech end closed by a cap in which a hole is formed excentrically. To charge the barrel the hole in the cap is brought in line with the axis of the barrel, the cap is then turned and the breech is closed. Leaden projectiles are to be coated with some mixture that will prevent oxidation and corrosion. For charging cartridges, self-acting apparatus is used consisting of plungers, which work with levers in a frame, and press down the charge into the cartridge cases; the latter are placed in a box and held while they are charged, and then allowed to drop through the bottom by removing a slide.

[Printed, 4d. No Drawings.]

A.D. 1859, December 8.—N° 2791.

MACINTOSH, JOHN.—“Improvements in cartridges and projectiles.”

The cartridge case is made of collodion by dipping a mandril in a solution of gun cotton. In some cases the projectile may be dipped into the solution and a chamber be attached to it to receive the powder. The projectile wad and powder with the collodion case are all introduced together into the barrel. Incendiary projectiles are made by fitting in the rear plugs of wood or other material saturated with a solution of bichlorate of potash. Hollow projectiles may be filled with combustible matter, which may be fired with a fuse in the ordinary manner.

[Printed, 4d. No Drawings.]

A.D. 1859, December 10.—N° 2807.

CHATTERTON, JOHN.—“Improvements in the manufacture of projectiles.”

Projectiles having passages formed in their interiors, upon whose inclined sides the air acts so as to give rotation, are made of lead or other metal by drawing the metal through a die. The die is like that used in drawing lead pipes, “except that the mandril has inclined grooves or notches formed in it which produce corresponding inclined ridges or projections within the pipe, the pipe so produced is cut off in lengths each suitable to form a projectile.” The projectile is subsequently finished by shaping

its ends. If required exterior projections may be formed upon the projectile in a similar manner.

[Printed, 4d. No Drawings.]

A.D. 1859, December 12.—N° 2820.

ROLLET, GEORGE HANDSON.—(*Provisional protection only.*)—

“An improved machine for the manufacture of pressed bullets.”

Pressed bullets are to be made by cutting a bar of lead into lengths by hand, and feeding the pieces into a screw press, in which a die or sets of dies may be used. Sets of dies are to be “mounted on face plates,” so as to produce any required number of bullets at each operation of the press.

[Printed, 4d. No Drawings.]

A.D. 1859, December 12.—N° 2821.

CLAY, WILLIAM.—“An improved mode of manufacturing cannon and other ordnance.”

“Piles, coils, or solid or hollow ingots or blooms of iron or steel,” suitable for being made into cannon, or parts of cannon, are made by rolling them in rolls grooved so as to give the required sectional form to the rolled bar. The object is effected “either with or without the use of a core or mandril, by means of rolling machinery in which the taper form is produced by allowing one of the shaping rollers to recede gradually from the other as the rolling operation proceeds.” Various modes of giving the required motion to the rolls may be used; the mode preferred is that described in the Specification of the patentee, dated December 16, 1848. In some cases the piles, or ingots, or blooms, may be first reduced in size by means of “billetting rollers” grooved in the required shape.

[Printed, 1s. Drawings.]

A.D. 1859, December 13.—N° 2829.

HARDING, WILLIAM.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms and in cartridge carriers.”

Breech-loading single or double barrel guns are to be made with the barrel working on a hinge below, but in place of the breech

being made to press against the breech plate a space is to be left between the breech plate and the barrel, in which is fitted a block having conical projections which fit into the recesses of the barrels. Nipples may be filled in the block which is bored. The cartridge carrier is to be made of a width corresponding to the length of the cartridges, which are pressed by a spring constantly towards one end of the carrier where there is a hole, and by depressing a thumb piece one cartridge is allowed to be pressed out. A cap holder may also be similarly made and be attached to the cartridge carrier.

[Printed, 4d. No Drawings.]

A.D. 1859, December 15.—N° 2852.

REEVES, CHARLES.—“An improvement or improvements in “breech-loading fire-arms.”

The breech end of the barrel “is opened and closed by a sliding plug which is capable of sliding and performing a partial rotation “in the prolonged end of the barrel.” When the plug is drawn back it is “still wholly within the prolonged end of the barrel.” A hole is made in the sliding plug to receive the cartridge; when it is inserted the plug is pushed forward and turned by a handle, so as to engage the plug and hold it firmly in its place during discharge. The piece may be fired by exploding a cap upon a nipple in the usual way.

[Printed, 10d. Drawings.]

A.D. 1859, December 17.—N° 2869.

HOCHSTAETTER, FRIEDRICH, and HOCHSTAETTER, HEINRICH.—(*Provisional protection only.*)—“The preparation of “a substitute for gunpowder.”

A composition that may be substituted for gunpowder is to be made by mixing together “(1) chlorate of potash or of lead (Pbo, CEO 3),” and “(2) nitrate of potash or of soda,” and (3) “char-“ coal or sulphur or a metallic sulphuret.” The proportions to be used are not stated. The mixture is dissolved in water, in which paper or vegetable matters are to be steeped, and so rendered capable of being exploded like gunpowder.

[Printed, 4d. No Drawings.]

A.D. 1859, December 20.—N° 2899.

FENTON, JAMES.—(*Provisional protection only.*)—"Improvements in cannon and other fire-arms and in projectiles."

The improvements are said to consist in "enlarging the bore of the barrel" to form a charge chamber and in "constructing the projectile so that the blow" of the ramrod will expand it to fill the chamber, and in making projectiles for smooth-bore barrels with the "front ends and under sides heavier than the remaining parts thereof."

[Printed, 4d. No Drawings.]

A.D. 1859, December 24.—N° 2936.

HULETT, DAVID, and BOCCIIUS, GOTTLIEB.—"Improvements in cannon and fire-arms, and in percussion cap holders and chargers."

A conical chamber is formed in the rear of the barrel, and the fire from the cap is directed to the apex of the cone. A magazine for caps is fitted with springs working in the cap holder, which pushes forward the caps as they are required and holds them in the required position for use.

[Printed, 8d. Drawing.]

A.D. 1859, December 30.—N° 2990.

WHITWORTH, JOSEPH.—"Improvements in projectiles and machinery for their manufacture."

The projectile is made with its rear part of a tapering shape, the degree of taper being made to have a proper relation to the fore part, according to its weight and form, and the purpose for which it is to be employed. For long ranges the shape of the front part is that "of a solid of least resistance," the middle part is left for a short distance parallel and the rear is made of such a shape that the air displaced by the fore part may "be replaced in the rear as soon as possible." Self-acting machinery is used for giving the required shape to iron or steel projectiles, several tools being made to operate simultaneously on different parts of the surface of the projectile.

[Printed, 1s. 6d. Drawings.]

1860.

A.D. 1860, January 7.—N° 51.

BAYLISS, BENJAMIN.—"Improvements in breech-loading fire-arms applicable for military and sporting purposes."

The barrel extends "about three inches behind the true breech." A stout vertical pin is fitted "through the extreme end of the barrel and down through the stock and trigger guard;" to its lower end "a lever is fastened," when out of use it lies below the trigger guard. In loading "the plug is pulled back by turning the pin nearly a half way round, which turns in the same direction an eccentric plate or cam that works through a horizontal slot formed in the breech end of the barrel." The plate has "curved and inclined surfaces" which pull back and impel forward the plug and open and close the breech.

[Printed, 10d. Drawing.]

A.D. 1860, January 7.—N° 55.

WILSON, JOSEPH WILLIAM.—"Improvements in apparatus for cleaning guns."

A flexible tube made by preference of vulcanised rubber is employed. It has attached to it at one end a socket which fits on the nipple of the gun, and the other end of the tube is introduced into a vessel containing water. The ramrod is wrapped round with tow or rag, so as to fit the barrel and being drawn up and down sucks up and expels water, and so cleans the barrel.

[Printed, 6d. Drawing.]

A.D. 1860, January 10.—N° 63.

ISAAC, SAMUEL.—"Improvements in overcoats particularly adapted to military purposes."

The cape is made of a double thickness of material; the under piece, being smaller than the outer piece, is gathered round the back of the neck of the wearer by elastic material. When the cape is used as a hood the elastic material draws it close to the face or head of the wearer. Elastic pieces are attached to the inner lining of the sleeves to draw them close to the wrists.

[Printed, 8d. Drawing.]

A.D. 1860, January 14.—N° 103.

WILSON, THOMAS.—“Improvements in breech-loading fire-arms.”

The breech end of the barrel is prolonged and a block hinged to a lid is used to form a breech. The block works in a vertical plane, and when shut down is fastened by a bolt pushed into a recess in its rear. Another modification consists of a hinged charge chamber, which is thrown back on the top of the barrel. The charge is then inserted in the open end which is towards the breech; the chamber is then shut down and fastened by a bolt.

[Printed, 8d. Drawing.]

A.D. 1860, January 17.—N° 117.

VOGL, DAVID.—(*Provisional protection only.*)—“Improvements in knapsacks, haversacks, and such like portable receptacles.”

The knapsack is to be made with large flaps which fold over a shallow box. The flaps, when folded on each other, form the lid and partly the sides of the box, and are fastened by straps or hooks.

[Printed, 6d. Drawing.]

A.D. 1860, January 25.—N° 187.

RAMSPACHER, THEODORE, and SCHMIDT, CHRISTOPHE FRÉDÉRIC.—“Preparing wire gauze to render it applicable to various purposes.”

Materials suited for, among other purposes, being made into cuirasses, or shakos, or helmets, are prepared by covering metallic gauze with caoutchouc, gutta percha, or other gums applied in a state of solution, and uniting it with suitable pieces of leather.”

[Printed, 4d. No Drawings.]

A.D. 1860, January 25.—N° 191.

KEIFFER, FRANÇOIS ANTOINE.—(*Provisional protection only.*)—“Improvements in fabrics suitable for straps for driving machinery and other purposes.”

A material suited for "being made into breast plates and other " armour for soldiers," and other purposes, is to be made by covering a fabric of "fine wire" with gutta percha or india-rubber, which may be vulcanised by mixing the gums with sulphur. In place of wire fabrics made of vegetable fibres may be used.

[Printed, 4d. No Drawings.]

A.D. 1860, January 30.—N° 238.

BROOKS, EDGAR, and WATERS, HENRY.—"New or improved " machinery to be used in the manufacture of guns and pistols, " and for shaping metallic and non-metallic substances for other " purposes."

Self-acting machinery is used for shaping the stocks and parts of the locks of guns and pistols. Two rough stocks are carried in a frame and have rotatory motion given to them, a finished model is fixed between the two rough stocks. Revolving cutters and a guide roller are carried in a moveable frame; the motion of the frame carrying the cutters is regulated by the pressure of the guide roller upon the model, the shape is thereby copied. Four recessing cutters capable of being raised and depressed by the action of levers are employed. Machines for making parts of gun locks are constructed on a similar principle of imparting to rough shapes the finished shape of a model, which guides and regulates the action of cutters mounted in moveable frames.

[Printed, 1s. 8d. Drawings.]

A.D. 1860, February 3.—N° 285.

ADAMS, ROBERT.—"Improvements in breech-loading guns, " and in making up cartridges for the same."

The barrel is hinged to the stock. Projections are formed on the under side of the barrel, one of which takes into a recess in the stock; the other is taken hold of and held by the end of a lever, which may form the trigger guard or fold over it. The lever draws down the barrels, and holds them securely in their place by means of a catch fastening. The hinge joint is placed at a greater distance than usual from the breech. Cartridges are made by employing a case of length sufficient to contain the power, and introducing a wad, and on the top of that an ordinary shot cartridge known as "Eley's." When a breech-loader is

intended to be loaded at the muzzle a moveable breech or plug is introduced into the barrel.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, February 4.—N^o 299.

BIDDELL, GEORGE ARTHUR.—"Improvements in projectiles."

Spiral grooves or passages are "formed at the periphery of an " ordinary elongated projectile," so that the gases may pass along or through them, and so give a rotatory motion to the projectile.

[Printed, 6d. Drawing.]

A.D. 1860, February 4.—N^o 308.

SMITH, JOHN.—"Improvements in the manufacture of handles " or knobs for sticks, umbrellas, and parasols, for swords, knives, " forks, and other articles of cutlery, for pistol butts, and small " arms stocks, and for other similar articles."

A composition suitable for being made into gun and pistol stocks and other purposes is manufactured by mixing about equal quantities of shell-lac and ebony dust in a heated state, and adding lamp black as colouring matter. Other colours may also be given to the composition by using suitable pigments. The heated materials are well mixed upon a slab heated by a stove, and are then pressed in suitable moulds. If great density is required mineral substances, as " barytes or oxide of manganese," are added, or vegetable fibres may be used to give tenacity.

[Printed, 4d. No Drawings.]

A.D. 1860, February 6.—N^o 312.

WALTON, JOHN WHITEHEAD.—"Improvements in rifles & " other small fire-arms."

A small and powerful telescope is mounted "on an upright " stem sliding vertically through a hole made in the stock of the " rifle." The eye-piece is placed in a convenient position, and the stem is graduated according to the distance for which the sight is taken. The telescope is provided with cross wires or pointers.

[Printed, 8d. Drawing.]

A.D. 1860, February 7.—N° 318.

ROBERTS, MARTYN JOHN.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The gun is to be bored "entirely through." In the breech part a groove is cut in the form of a segment of a circle. A plug is fitted into the breech, and the effect of the explosion "is to drive the plug into close contact with its seat in the groove," and so close the breech. The gun is loaded by inserting the charge in the open breech.

[Printed, 4d. No Drawings.]

A.D. 1860, February 7.—N° 328.

COOPER, JOSEPH ROCK.—"Improvements in breech-loading fire-arms and ordnance."

The breech end of the barrel is prolonged, and an opening is made in the top of the prolonged part. A sliding plug is used to close the breech end of the barrel. The plug is jointed by a link to a lever moving on a hinge joint fixed on the solid breech at the end of the barrel. When the lever is raised the link draws back the plug, and leaves the breech of the barrel unclosed; the charge is then inserted, the lever is put down, and the plug being pushed forward closes the end of the barrel. On the under side of the lever is a projection or block, which when the lever is shut down, is inserted between the sliding plug and the solid breech, and holds the plug firmly in its place in the breech of the barrel. On the hammer side of the lever is a projection, which is hit by the hammer if the lever is from carelessness not properly shut down; by that means the lever is made to fasten itself by a spring.

[Printed, 10d. Drawings.]

A.D. 1860, February 10.—N° 358.

DAWES, JOHN SAMUEL.—(*Provisional protection only.*)—"An improvement or improvements in breech-loading fire-arms and ordnance."

The breech end of the barrel is to be prolonged, and "a portion of the prolonged part corresponding to the length of the cart-

"ridge" is to be so constructed that "the upper half of it may slide back from the lower half," so as to leave it "open and ready to receive the cartridge." The upper or sliding part is attached to a tube "which slides on and securely covers the whole of this part of the breech, a fast or secure end of the breech being constantly maintained by means of a smooth cylindrical bar of the same size as the bore of the barrel, and firmly fixed in the direction of the bore, and forming part of the breech itself. The moveable part of the breech slides on the upper half of the said bar."

[Printed, 4d. No Drawings.]

A.D. 1860, February 11.—N° 371.

NEVILL, WILLIAM, and BARK, CHARLES.—(*Provisional protection only.*)—"Improvements in the manufacture of fleecy web."

Instead of the material with a woollen face previously used for cleaning the bores of guns, it is proposed to employ a fleecy web composed of vegetable instead of animal fibre. The vegetable fibre is not injuriously affected by acid like the woollen fibre. It may be manufactured with a woollen or other back.

[Printed, 4d. No Drawings.]

A.D. 1860, February 11.—N° 373.

SHEDDEN, THOMAS.—"Improvements in fire-arms."

Muzzle-loading guns are converted into breech-loaders by cutting off the rear part of the barrel, and attaching it by a screw to the barrel. A space is left in which a wedge-piece, or stop, or key is inserted to close the breech.

The charge is inserted in the opening left at the top of the barrel; the wedge-piece is then closed down and held in its place by a bent spring piece. The cartridge may be either fired by a cap placed on an ordinary nipple, or it may be ignited by a percussion patch attached to the base of the cartridge.

Breech-loading guns are constructed on a similar principle, the breech end being attached to the barrel, and a suitable opening being left to receive the wedge-piece or stop.

[Printed, 10d. Drawings.]

A.D. 1860, February 11.—N° 375.

HENRY, ALEXANDER.—“Improvements in apparatus for cleaning fire-arms.”

A short piece of brass tube is attached to the nipple of the fire-arm, or if the nipple be unscrewed one end of the tube is made to screw into its seat; to the other end of the tube is attached a piece of flexible tubing of vulcanised rubber or other material. On the end of the tube is fixed a perforated nozzle-piece, which is inserted in a vessel filled with water. The water, by means of suction or otherwise, is drawn through the tube into the barrel, and then expelled so as to wash out the barrel. A funnel-shaped cup is fitted on the muzzle of the gun to prevent overflow of water as the ramrod wrapped with tow is worked up and down the barrel, and also to prevent the rifle grooves from being injured. The cleaning apparatus may be so combined as to form a key.

[Printed, 8d. Drawing.]

A.D. 1860, February 13.—N° 382.

HEWETSON, HENRY.—(*Provisional protection only.*)—“Improvements in rockets.”

Spiral wings or ribs are to be attached to the exterior of a rocket case. The stick ordinarily used is dispensed with, and a tube is to be inserted in the axis of the rocket, so that it may be placed on a rod, from which it is discharged. The rod may be fixed in the breech of a mortar or gun, from which the rocket may be fired; or the rod may be fixed to a frame, to which rotatory motion is given by pulleys when the rocket is discharged.

[Printed, 4d. No Drawings.]

A.D. 1860, February 13.—N° 384.

HADDAN, JOHN COOPE.—“Improvements in the manufacture of guns, and of projectiles to be used therewith.”

Projectiles for rifled guns are made with “swellings or swells” corresponding to the grooves of the rifled bore, the swells being made comparatively “quickly curved at the ends of the curve of the swell,” and comparatively “flatly curved on the middle portion of such curve.” The projectiles are made with a tapering rear and are steadied with wads. The rifle grooves are not carried further

towards the breech than the part where the swells of the projectile lie when the piece is charged. Hollow projectiles or shells are made with their largest diameter near the head of the shell, the rear being of a taper form. To enable hollow projectiles to be broken up when required, a taper plug is inserted in the front part. When it is required to discharge bullets or other missiles from the projectile, the front part is so made that it may be blown off, and the contents of the projectile are blown out by a bursting charge ignited by a fuse. Cast-iron guns are strengthened by coiling "around the exterior" bands or strips of metal, applied in a heated state, and allowed to shrink upon the gun.

[Printed, 10d. Drawings.]

A.D. 1860, February 13.—N° 389.

SHEDDEN, THOMAS.—"Improvements in the manufacture of "cartridge cases for fire-arms, and in the arrangement of primers therefor."

Cartridge cases are made by introducing ordinary paper pulp or other suitable pulp into a mould, and pressing the pulp by a core into the required form; the case so moulded is then dried. Cartridges containing their own ignition are fired by a pin acting at right angles to the axis of the cartridge.

[Printed, 6d. Drawing.]

A.D. 1860, February 13.—N° 393.

BOWLEY, KANZOW THOMAS.—(*Provisional protection only.*)—"An improved knee-cap for military, sporting, or other purposes."

The knee-cap is to be made of "a semi-globular form to fit that part of the leg above and below the knee when in the act of kneeling." It may be made of gutta-percha or india-rubber blocked into the required form, and be attached to the leg by straps or springs.

[Printed, 4d. No Drawings.]

A.D. 1860, February 15.—N° 414.

NUTHALL, WILLIAM FROST.—(*Provisional protection only.*)—"An improved portable machine for correcting and boring rifle bullets, also for turning in shot cartridge cases."

The apparatus intended to be used consists of "a rack and pinion fixed in a metal frame which holds a die." To the rack is "attached a moveable plunger, and in order to swedge or correct a bullet it is placed in the die" and forced through. For converting the bullet into a shell a gimlet is to be used, which bores a hole in the apex of the bullet.

[Printed, 4d. No Drawings.]

A.D. 1860, February 16.—N° 427.

CLARK, WILLIAM.—(*A communication from Jean Baptiste Adolphe Jay.*)—(*Provisional protection only.*)—"Improvements in sword and other sheaths or scabbards."

Scabbards are proposed to be made in parts, which are caused to slide one within the other, like the parts of a telescope. The scabbard may thus be made to shorten itself when the sword is drawn.

[Printed, 8d. Drawing.]

A.D. 1860, February 17.—N° 430.

JOHNSON, JOHN HENRY.—(*A communication from Eugene Lefancheux.*)—"Improvements in fire-arms."

The stock and butt of the piece are made "in the form of a single metal skeleton, which carries the lock" to which the wooden butt is fitted in two parts. "A moveable breech piece is used, turning on the same axis as the hammer, and effectually closing the end of the barrel, which is fixed." Instead of wood stamped metal may be used for the butt. In breech-loading fowling-pieces the diameter of the chamber is enlarged to allow of a shorter cartridge being used. Instead of having a moveable breech it may be fixed, and the barrel be made to move by a rack and pinion motion.

[Printed, 10d. Drawing.]

A.D. 1860, February 20.—N° 461.

MART, FREDERICK WILLIAM.—"Improvements in the manufacture of mops or sponges for cleansing cannon."

A fabric is woven of strong yarns of vegetable fibre; and on the face of it a strong cut pile is produced, by preference, of strong

fibres of hemp, in a manner like that in which pile for rugs is produced. The fibre may, if required, be of wool or partly of wool and vegetable. The fabric is sewn in the form of a tube, and is fixed on a stem to form a gun sponge.

[Printed, 6d. Drawing.]

A.D. 1860, February 20.—N° 464.

TOWNSEND, G. W.—(*Letters Patent void for want of Final Specification.*)—"An improvement in projectiles."

In order to give the projectile the requisite rotatory motion, spiral grooves are to be made "in and on the outside thereof." The gases of explosion passing along the grooves give the desired rotation.

[Printed, 4d. No Drawings.]

A.D. 1860, February 22.—N° 472. (* *)

LEMOINE, FRANÇOIS HYPOLITE.—"Improvements in the manufacture of waterproof papers and pasteboards of every description."

This invention consists in the application of gutta percha alone or mixed with white pitch, gum lac, &c., varying according to the quality of the paper or pasteboard, of its strength, and of the purpose for which it is intended. This application must be made warm, and may be either in a liquid or solid state, and applied on any kind of papers by any suitable means. In the case of paper hangings the invention is a preservative against dampness, and with regard to other paper, as also to pasteboard, the new process furnishes a substitute for tin, zinc, or any other metal employed for the packing of goods for exportation. Chests, boxes, and other articles are to be made of the said waterproof substance; and it is also to be used in the "fabrication of cartridge tubes."

A Disclaimer and memorandum of alteration was filed on the 26th April 1861, for the purpose of amending and correcting some defective and ambiguous parts of the Specification.

[Printed, 8d. Drawing.] [Disclaimer printed, 4d. No Drawings.]

A.D. 1860, February 22.—N° 474.

GREVÈS, CHARLES.—(*Provisional protection only.*)—"Improvements in fire-arms."

Revolvers are proposed to be made with the "barrel body and "back part" formed in one solid piece of metal. To the cock is to be attached "a lifter to operate upon the revolving chamber;" the trigger is to be so constructed "as to act as trigger, sear, stop, "and hold of cylinder."

[Printed, 4d. No Drawings.]

A.D. 1860, February 22.—N° 483.

REYNOLDS, EDWARD DUNKLEY. — (*A communication from William Stow.*)—(*Provisional protection only.*)—"An improved "rifle ball."

In order to throw the weight of the bullet to the front part a deep channel or groove is to be formed round its base. The groove is to be filled with elastic fibrous material wrapped round, so as to clean the barrel at each discharge.

[Printed, 4d. No Drawings.]

A.D. 1860, February 23.—N° 491.

NUTHALL, WILLIAM FROST, and HUMFREY, CHARLES.—(*Provisional protection only.*)—"An improved lubricant for small "arms and ordnance ammunition."

"Paraffine, or preparations thereof," are to be used "for the "purpose of lubricating cartridges, service ammunition, and "projectiles." The substance is intended to diminish windage, prevent the paper envelope of a cartridge from being destroyed, and prevent fouling. An even coating is given to the cartridge, which is not affected by changes of climate.

[Printed, 4d. No Drawings.]

A.D. 1860, February 25.—N° 520.

SCOTT, EBENEZER ERSKINE.—(*Provisional protection only.*)—"Improvements in and pertaining to breech-loading guns and "fire-arms."

The barrel of the piece is to have a hinge motion connecting it to the stock. The fixed breech is in the form of the frustrum of a cone, and the rear end of the barrel is to be recessed to correspond. The discharge is to be effected by means of a percussion

cap, and at the base of the cartridge is a greased wad, which is left behind after discharge, and is pushed forward when the next cartridge is inserted.

[Printed, 4d. No Drawings.]

A.D. 1860, February 25.—N° 524.

GREEN, CHARLES EDMUND, and GREEN, JOHN.—(*Provisional protection only*).—"Improvements in breach-loading fire-arms."

The breech of the barrel is to be closed by means of a conical plug having "attached to it behind a double-acting wedge," which "works against two metallic inclined shoulders, let into the stock one on each side, and when these are brought into action together, operating like a male and female screw, they force the plug into the breech or end of the barrel grooved to receive it, or withdraw it." The plug and wedge are to be fixed on a spindle or bars actuated by a lever handle.

[Printed, 4d. No Drawings.]

A.D. 1860, February 25.—N° 526. (* *)

LANG, JOHN, and CHEVALIER, CHARLES.—"Improvements in targets."

1st. "The construction of targets composed of several pieces (irrespective of their shape and configuration), and connecting each part or piece by means of electric, electro-magnetic, or galvanic apparatus, by means of two or more wires, with one or more needles or pointers, and by which the part of the target hit can be indicated or recorded at or near to the point from which the projectile is discharged, or wherever else it may be desired to convey such indication." The target is not fixed immoveably to the framing, as is ordinarily the case, but is connected thereto by means of levers and springs, so that the impact of a ball upon any one of the pieces composing the target completes an electric circuit. The normal position of the pieces or plates of this target is described and shown as being flush with each other. The indicating apparatus may have a needle and separate conducting wire to each portion of the target; but the number of needles and conducting wires may be reduced by using "the changes and permutations which can be made" with a given

number of needles and positive and negative currents, to indicate separate portions of the target struck.

2nd. Using an electric circuit in connection with the above-mentioned target, and with "electric, electro-magnetic, or galvanic apparatus, or with a galvanometer of any suitable construction, "either alone or in combination with a stop-watch," for measuring the time of flight and the force of the blow of the projectile. The time may be measured by the "traversing of a pencil over ruled paper moved by clockwork," and the force may be ascertained by means of the electric circuits respectively completed by projections from the back of each piece of the target.

[Printed, 8d. Drawing.]

A.D. 1860, February 29.—N^o 560.

SCHWAB, FREDERICK.—(*Provisional protection refused.*)—"Improvements in breech-loading fire-arms."

The proposed improvements are described as consisting "of a mechanical arrangement by which the wear and damage caused by the fall of the barrels in breech-loading fire-arms are entirely prevented, and otherwise facilitating the action of fire-arms."

[Printed, 4d. No Drawings.]

A.D. 1860, March 1.—N^o 566.

KRUTZSCH, WILLIAM.—"Improvements in cartridges and projectiles."

Wooden cylinders bored and turned, so as to be of the required shape, are used for cartridge cases instead of paper or metal. Small metal shots are combined with soap, or soap and glue, so as to form a projectile that will break up on discharge.

[Printed, 8d. Drawing.]

A.D. 1860, March 1.—N^o 567.

BRITTEN, BASHLEY.—(*Provisional protection only.*)—"Improvements in projectiles."

In order to make ordinary spherical iron projectiles suitable for rifled guns a coating of lead is to be attached to them. A wooden base may be attached to the leaden jacket, in such a manner as to cause the lead to be expanded into the rifle grooves when the

projectile is fired. The projectile is to be first cleaned with acid, then coated with zinc or tin, and is then placed in a mould of suitable shape, and coated with molten lead.

[Printed, 4d. No Drawings.]

A.D. 1860, March 8.—N° 634.

PALLISER, WILLIAM.—(*Provisional protection only.*)—"Improvements in breech-loading rifles & other guns, & in cartridges to be used with such like fire-arms, also in shot used with rifled guns."

Breech-loading arms are to be made with a hinged breech piece, and the breech end of the barrel is recessed to form a tight joint.

Cartridges for breech-loaders are to be made with a small percussion tube projecting from the side; the tube is struck by a hammer, and so ignites the cartridge.

Iron projectiles for rifled guns are made with brass pins, which take into the rifled grooves of increasing pitch.

[Printed, 4d. No Drawings.]

A.D. 1860, March 8.—N° 636.

SPILLER, GEORGE.—"Improvements in knapsacks."

The improvements are based upon those described in a former Specification, dated December 2, 1858, N° 2760, and their object is to prevent the knapsack from "falling back and pressing on the spinal column of the wearer," and also to "allow a free circulation of air between the body and the knapsack."

The object is effected by means of metallic supports or rests attached to the lower part of the knapsack, and passing into suitable eyes or loops in a belt which passes round the body of the wearer.

[Printed, 6d. Drawing.]

A.D. 1860, March 9.—N° 641.

BIELEFELD, CHARLES FREDERICK.—"Improvements in the manufacture of wads for guns, and in cases for containing the charge of powder for the same."

Wads are made by grinding up fibrous material with size or other suitable cement in a plastic state. The plastic compound is then placed in a mould, and is pressed into the required shape.

A recess may be made in the wad to receive a plug; cases for containing the powder charge may be made by moulding the plastic material in two parts, which when joined together form the powder case.

[Printed, 4d. No Drawings.]

A.D. 1860, March 9.—N° 643.

CLAY, WILLIAM.—“Improvements in the manufacture of gun barrels, cannon, and other ordnance.”

When rolling iron or steel intended to be used in the manufacture of guns and gun barrels, a rotatory motion is given to the pile bloom or mass of iron while it is being passed through the rolls. By these means the fibres of the iron are laid spirally or helically instead of longitudinally, as in the ordinary mode of rolling. Various mechanical means may be used for giving the required motion; the apparatus preferred is similar in construction to that described in a former Specification dated March 7, 1854.

[Printed, 4d. No Drawings.]

A.D. 1860, March 10.—N° 646.

LUIS, JOZÉ.—(*A communication from Jean François Joseph Lecocq.*)—(*Provisional protection only.*)—“An improved carious varnish for coating wood, metals, paper, ships, and other substances.”

Varnish suited for coating ships, iron-clads, and for other purposes is to be prepared by mixing oxides of calcium as plaster or lime with pure gutta percha or india-rubber dissolved in the usual solvents. The proportions used may be varied according to the nature of the varnish required, whether it be liquid, or pasty, or solid. Paper coated with the varnish may be used for cartridges.

[Printed, 4d. No Drawings.]

A.D. 1860, March 10.—N° 658.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—“Improvements in the manufacture of projectiles, and of cannon for discharging the same.”

The ordinary spherical projectiles are to be made suitable for being used in rifle guns by employing cap wads and forming wings or swellings upon the projectiles; or the wings or swellings may be formed upon or fixed to the wads, and these are made to hold the projectile and give it rotation in the barrel, but are detached during the flight.

In making breech-loading guns a moveable breech plug, with an enlarged head, is to be used, which is to be fixed in its place by means of a screwed metal cap, or by means of links or rods attached to trunnions. The touch hole may be made through the plug.

[Printed, 4d. No Drawings.]

A.D. 1860, March 12.—N° 661.

LANGMAN, JOHN.—“An improved cartridge and method of manufacturing the same.”

The cartridge is made of a case of cardboard, paper, or other material, open at both ends. The case may be made of layers of paper cemented with shellac and naphtha. The internal part may be lined with metal foil. When a bullet is employed the rear end of the bullet projects about one-third from one end of the cartridge case, the other end is covered with a cap or cover, which is torn off when the cartridge is used. For blank cartridges a thick wad is put in the place of the projectile; for shot cartridges, caps or covers are affixed to both ends of the cartridge.

[Printed, 6d. Drawing.]

A.D. 1860, March 15.—N° 685.

WILSON, THOMAS.—“Improvements in breech-loading fire-arms.”

The breech of the barrel is elongated about three inches, and its open end is closed during discharge by a sliding plug moved by a handle attached to its outer end. The upper part of the plug is cut away “leaving it of a nearly semi-cylindrical figure.” In order to fix the plug a cover is hinged to the breech, which when shut down “fills up the opening in the breech.” On its under side “is a projection . . . which fits in the cut-away part of the plug and holds it firmly during fire.” The plug may be fixed “by a top piece jointed to the front end of the plug.” A

handle on the top piece "serves to raise and lower it, and also to "move the plug."

The breech plug may be made to slide and rotate in bearings attached to the under side of the cover hinged to the breech. The plug is fixed in its place by a screw pin turned by a fly handle.

[Printed, 8d. Drawing.]

A.D. 1860, March 15.—N^o 693.

STURROCK, GEORGE.—(*Provisional protection only.*)—"Improvements in revolving fire-arms."

The revolver is to be made with two barrels, one placed above the other. The charge cylinder is to be made "with two concentric rows of charge chambers."

A single striker may be employed.

[Printed, 4d. No Drawings.]

A.D. 1860, March 15.—N^o 694.

NORMAN, WILLIAM NICHOLAS, and LUBÉ, JOHN.—(*Provisional protection refused.*)—"Improvements in guns and other "fire-arms, and in cartridges to be used therewith."

In making the "break-off" of breech-loading guns, a solid piece of metal is to be attached "to the back ends of the barrels about "four inches long," and having "at one end a projection corresponding with a slot in the break off, and at the other end a "pivot." A hammer is to be used with a moveable striker, so that cartridges can be exploded "either at the centre or "side." The cartridge can be ignited "either at the centre or side" by means of a wire in the one case inserted perpendicularly, in the other horizontally, with a detonating cap at the base of the cartridge.

Revolvers are to be made "with a strap of iron attached to "the barrel and frame of the pistol." The barrel of a sporting gun is to be "made in the form of a square."

[Printed, 4d. No Drawings.]

A.D. 1860, March 20.—N^o 720.

PARSONS, PERCEVAL MOSES.—"Improvements in fire-arms and "projectiles to be used therewith."

The breech end of the breech-loader is closed when the charge is inserted, by means of a plug carried by "a lever attached to the breech by a hinge joint." The plug fits into the slot or chamber, and "when in position, one end of the plug abuts against the end of the slot, and the other end, which is made of a spherical form, rests in its seat at the breech of the barrel and closes it."

In constructing rifle barrels the bore is made "of a figure in cross section described by three curved lines joined at tangents by three other curved lines of a different radius, or curvatures from the three first, all being convex externally." This figure "has the requisite spiral twist round its mean centre, in the length of the barrel."

Back sights for fire-arms are made "in the form of a spring clip, made to embrace the barrel," and sliding on "flat parallel surfaces" formed upon it.

Projectiles may be made of a conical or taper form both in front and rear, and be made in two parts, the fore part being of a metal or alloy of greater specific gravity than the rear part.

[Printed, 1s. 2d. Drawings.]

A.D. 1860, March 22.—N^o 745.

GRAINGER, JOHN.—"An improvement or improvements in breech-loading fire-arms."

The breech of the barrel is closed by a hinged plug, which moves horizontally on a vertical axis. The plug is made in two parts; the fore part is connected with the rear part by a quick threaded screw, and is turned by a lever handle placed on the outer or right-hand side of the barrel. When the piece is to be charged the lever handle is moved upwards, the fore part of the plug is thereby screwed back on the hind part, and is withdrawn from the breech; the plug is then moved out from the charge chamber and the cartridge is inserted; the plug is then pushed back into its place, and the fore part, by turning the handle, is screwed forwards into its seat in the breech.

The percussioning may be on the left side of the gun, or the hammer may be made to act at right angles to the barrel, on a nipple placed in front of the hinged plug, and on the right-hand side of the barrel.

[Printed, 10d. Drawings.]

A.D. 1860, March 23.—N° 752.

PRATER, CHARLES.—“Improvements in ammunition, bayonet, “and sword belts, and in pouches to be worn therewith.”

The belt is shaped “so as to form a portion of a conical surface cut off by circles parallel to the base of the cone,” so that it “fits well on the brim of the pelvis,” and the pressure of the weight carried rests on the hip joints. The pouch is attached to the belt, and shoulder straps are dispensed with; the pouch is made to hold three packages of cartridges, ten in each.

[Printed, 6d. Drawing.]

A.D. 1860, March 23.—N° 762.

DEANE, JOHN, DEANE, JOHN, junior, and HARDING, WILLIAM.—(*Partly a communication from Captain Alexandre Delvigne.*)—“Improvements in breech-loading fire-arms.”

The barrel of the gun is composed of a number of “small “hexagonal barrels, bored from end to end:” between the breech end of the barrels and the breech of the gun is a moveable plate, having holes in it corresponding to the barrels, and also to the charge chambers formed in the breech. The bullets are placed in the holes in the moveable plate, which is then inserted in its place, the chambers having been previously filled with powder. All the powder chambers are made to communicate with the nipple, so that the barrels are all discharged simultaneously.

[Printed, 10d. Drawing.]

A.D. 1860, March 26.—N° 776.

CARTER, JOHN MONEY.—“Improvements in knapsacks and “pouches for the use of soldiers and others.”

The knapsack is made of light frame-work, “concave on the “side that presses on the back of the wearer;” the covering of the knapsack is strained over the frame. Two curved bars are attached to the under side of the knapsack, and support it by means of straps passing over the shoulders. Means for carrying the rifle “at the slope,” are provided; they consist of a metal holder fastened on the knapsack strap, and a hook attached out-

side the trigger-guard of the rifle. The cartridge pouch is made with a hinged end opening outwards.

[Printed, *8d.* Drawing.]

A.D. 1860, March 26.—N° 783.

JOHNSON, JOHN HENRY.—(*A communication from Jean Baptiste Vin.*)—"Improvements in shaping metals, and in the "machinery or apparatus employed therein."

Grooved eccentric rolls are employed for rolling blades of swords, sabres, and other articles. The grooves are shaped to give the desired form to the articles. The article "presented on "one side of the rolls returns in place of passing through to the "opposite side." The article being introduced between the eccentric rolls, when "their surfaces are farthest apart," is gripped as they approach and forced toward the attendant.

[Printed, *8d.* Drawing.]

A.D. 1860, March 30.—N° 824.

DAVIES, JOHN, and PAINE, GEORGE.—"Improvements in "the manufacture of gunpowder."

The following materials are employed to make gunpowder of a white colour :—

"Yellow prussiate of potassa - $\frac{1}{4}$ lb.

Chloride of potassium - $\frac{1}{2}$ lb.

Loaf sugar - - - 2 oz.

Crystallized sugar - - - 2 oz., and

Brimstone - - - 1 oz."

The materials are finely powdered, and mixed together when fired. The gunpowder leaves the piece "perfectly clean," and it is "quicker and more powerful" than ordinary gunpowder."

[Printed, *4d.* No Drawings.]

A.D. 1860, April 5.—N° 878.

HENRY, MICHAEL.—(*A communication from Henry François Cohade.*)—"Improvements in the mode of and apparatus for "obtaining motive power."

Motive power is obtained by causing gases to be suddenly generated by explosion in a confined chamber, and causing the

pressure of the gases to move a suitable piston. Mixtures of oxygen and hydrogen gases are exploded by electricity. The motion so obtained may be applied in working propelling engines, or it may be applied in the construction of "engines of war." The Specification does not state how the application is made.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, April 7.—N° 880.

CLARK, WILLIAM.—(*A communication from the "Starr Arms Company."*)—"Improvements in fire-arms."

The revolver is made with a cylinder frame, formed of two hinged pieces, which lap over and are fastened together. The cylinder is prevented from revolving too far by a stop tooth formed on "the revolving-dog." The cocking lever is applied in combination with a separate trigger, so that "the trigger may be operated by the continued pull of the cocking lever, beyond the position at which it effects the cocking." A shifting stop is used to enable the firing to be effected, either by a continued back pull of the cocking lever, or by touching the trigger after the hammer is cocked. To enable the caps to be readily applied to the nipples, "a double guide channel" is made in "the stationary recoil plate," being a "wide channel to guide the forefinger, and a narrower one to guide the caps to the nipples."

[Printed, 8d. Drawing.]

A.D. 1860, April 10.—N° 899.

RIGBY, JOHN, and NORMAN, WILLIAM NICHOLAS.—"Improvements in guns and other fire-arms, and in cartridges to be used therewith."

The barrels of a breech-loader, which are turned down to receive the charge, are made to turn on an axis fixed on a strong metal plate attached to the stock of the piece, the ends of the barrels and the breech plate being curved, and forming part of a circle, whose centre is the axis on which the barrels turn, but slightly eccentric thereto, to insure the barrels being pressed against the breech and making a tight joint. Pin cartridges are used with a short vertical pin. Upon the hammer is a projection that corresponds to and strikes the short projecting pin.

Instead of the pin being inserted vertically, it may be inserted horizontally and centrally, and be fired by a blunt nose piece, attached to a hammer instead of a needle. Cartridges are made "with a case or lining of thin brass or other sheet metal," which encircles the wad containing the cap in its centre, and "having a lap on itself, equal to about one-third or one-fourth part of the circumference," or a "capsule of thin metal may be used."

Breech-loaders, in which the barrels are moved from the breech, and are turned down on a hinge to receive the charge, have a recess formed in the breech, into which the end of the cartridge is forced by the explosion, so that it is held there, and the exploded case is easily withdrawn.

Revolving pistols are made with a hinged barrel moved by a lever, and connected with a rammer for loading the chambers.

[Printed, 1s. Drawing.]

A.D. 1860, April 12.—N^o 913.

WEBB, JOHN.—"Improvements in the cartridges employed in "blasting."

The blasting charge is enclosed in a tube made of thin cloth, made waterproof by any of the usual methods.

To prevent accidents from smouldering fire when the fuse is imperfect, "a bunch of cowhair flannel or other similar loose woollen material," is interposed as a wadding between the tamping and the charge, being fastened round the fuse near the cartridge.

[Printed, 4d. No Drawings.]

A.D. 1860, April 13.—N^o 921.

VANDENBURGH, ORIGEN.—"Improvements in projectiles and appliances of projection, imparting great precision and "great range of flight to projectiles forced through the air by "gunpowder or other explosive compound, with facility for rapid "discharge, and for discharging many projectiles simultaneously "by one projecting appliance with the same advantages, giving "increased area to the space covered by the destructive projectile "matter, and light weight and small space to the appliance for "projection."

The projectiles are elongated and pointed both at the fore and rear ends; at the rear ends are curved fins, corresponding in curve with the rifle grooves, into which the fins fit. To prevent leakage of gas the charge is introduced "in an elastic expanding steel tube, provided with a suitable expanding breech piece." The tube and breech piece are inserted in the charge chamber, and "secured therein by a moveable breech head." Clusters of barrels are used, as many as thirty-seven barrels being connected by channels to one discharging or igniting channel, by means of which all the charges in the separate barrels are fired.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, April 14.—N^o 942.

NEWTON, ALFRED VINCENT.—(*A communication from Edward Savage.*)—(*Provisional protection only.*)—"Improvements in "rotating breech fire-arms."

"Moveable cylindrical bushings or thimbles" are to be used in the rotating breech cylinder, and are to be "fitted into cavities "formed round the front portions of the chambers," in such a manner "as to fit to a face or seat at the rear end of the barrel." The breech pin on which the cylinder rotates "is held in place by "a screw passed transversely through the frame which carries "the barrel."

[Printed, 4d. No Drawings.]

A.D. 1860, April 16.—N^o 954.

FITZ-GERALD, DESMOND GERALD, and BATE, GEORGE.—
"An improved method of igniting the charge in ordnance and
"other fire-arms."

To the back end of the cartridge proposed to be used "a coating of a composition formed of about one part of phosphorous, "by preference amorphous, one part of sulphuret of antimony, "and two parts of emery powder, with liquid glue or gum" is applied. The cartridge may contain powder and bullet made up in the ordinary way. Ignition is effected by causing a globule "formed of a mixture of chlorate of potash and antimony" to be pushed forcibly against the back of the cartridge, when charged. This is done by causing the globules to be fed from a chamber in the stock of the gun, and striking them by a sliding striker against

the back of the cartridge. Other chemical mixtures may be used in the place of those mentioned.

[Printed, 6d. Drawing.]

A.D. 1860, April 16.—N° 957.

CLARK, WILLIAM. — (*A communication from Hugo Frédéric Forbes and Jean François Félix Challeton.*)—"Improvements in breech-loading fire-arms and in projectiles, as also in apparatus for reducing ordinary guns to condition suitable for such improvements in fire-arms, which apparatus is also applicable for other purposes."

Gun barrels are twisted in a twisting machine, which gives the barrels "increased thickness and strength," by causing the fibres to be laid spirally instead of longitudinally. An eccentric screw is employed for closing the breech of breech-loading ordnance and fire-arms.

Percussion shells are made with a projecting striker fixed in the front of the projectile, and communicating with an ignition cap or primer in the interior.

[Printed, 1s. 2d. Drawings.]

A.D. 1860, April 16.—N° 958.

TURNER, THOMAS.—"Certain improvements in rifling applicable to either breech or muzzle loading fire-arms or ordnance."

In order to prevent fouling in rifled barrels the grooves are cut "of irregular depths," which are diminished "from the breech to about a third of the length of the piece more or less," and from "there to the muzzle" the depth is uniform. "Instead of the angles of the grooves being at right angles with the base line of the caller" they are so made that "the face of the bands from the breech to about one-third of the length will increase in width as the depths of the grooves decrease," and from there to the muzzle will be uniform.

[Printed, 10d. Drawing.]

A.D. 1860, April 18.—N° 970.

CANOUIL, GERMAIN. — (*Provisional protection only.*)—"Improved compositions for priming percussion caps, and a machine or apparatus employed therein."

A percussion composition is proposed to be made by mixing "chlorate of potash, 100 parts; glass powder, 100 parts; hydro-sulphite or cyano ferrique of lead, 80 parts; amorphous phosphorus, 2 parts water, 200 parts." The ingredients are to be reduced to powder separately, and mixed with water to form a paste.

[Printed, 4d. No Drawings.]

A.D. 1860, April 24.—N° 1018.

ORIARD, LOUIS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms and in their cartridges."

The barrel of the breech-loader is to be made to slide in its bed, and is pushed forward to allow the cartridge to be inserted. The cartridge is to be made in two parts, the rear part of copper containing the ignition primer and the powder, the fore part of paper containing the shot. When a bullet is employed for the charge its base is to be inserted in the copper case without paper.

[Printed, 6d. Drawing.]

A.D. 1860, April 24.—N° 1029.

MORGAN, HENRY JOHN.—(*Provisional protection only.*)—"Improvements in rockets."

Rockets are proposed to be made with cases shaped externally to fit the rifled bore of a barrel, from which they are to be fired like an elongated projectile, sufficient rotation being given by the rifling. The rocket composition is to be made to issue from holes in the rear of the case, and its ignition may be delayed, if necessary, until the rocket has "completed a portion of its flight."

[Printed, 4d. No Drawings.]

A.D. 1860, April 26.—N° 1053.

JOHNSON, JOHN HENRY.—(*A communication from Eugene Etienne Barbier St. Ange.*)—"Improvements in portable bedsteads, and in the mattresses to be used therewith."

Bedsteads suitable for camps or hospitals are made by joining a number of frames together by means of pin joints.

The frames are made narrower towards the foot. The head is an inclined frame forming a box, which is made to enclose the

charge is pushed in by a ramrod which works in a locking ring placed between the end of the barrel and the screw piece, and partly turned by a lever. Wings or vanes are attached to the projectile, or internal passages are made in them so as to give rotation by the action of the air during flight.

Projectiles are made by casting them in moulds formed in sand.

[Printed, 1s. Drawings.]

A.D. 1860, May 1.—N° 1097.

WALSH, JOHN HENRY.—(*Provisional protection only*).—"An improvement in breech-loading fire-arms and in rests to be employed therewith, which rests are also applicable to other descriptions of fire-arms."

The charge chamber is to be made of iron or steel, and be capable of being separated from the barrel and connected thereto by means of "a frame." The barrel is to be screwed into the upper part of the frame, which is to be fixed to "the lower part by a hat at the breech end, and by one or two loops and slides at the fore end." When the piece is to be charged, the frame is to be disconnected, and the chamber exposed to receive the charge.

A rest for firing rifles is to be made of a cradle attached to the left arm, and having a cap for the elbow to rest in. A rod is attached to the cap, and is fixed at its lower end in a socket in the belt of the marksman.

[Printed, 4d. No Drawings.]

A.D. 1860, May 7.—N° 1128.

DOUGALL, JAMES DALZIEL. — "Improvements in breech-loading fire-arms."

The hinge on which the barrel or barrels of a breech-loading gun work, when turned down to receive the charge, is made with a hinge pin that is "eccentric at the part fitting the half socket in the lug by which the barrels are held."

The hinge pin is turned by "an external handle, and, when so turned, its eccentricity causes a slight longitudinal movement to be imparted to the barrels." This movement locks "the barrels with their breeches hard up against the false breech," and holds them from rising up. "The holding down lug may be formed with a projecting tongue, which enters a socket" in the

bottom of the false breech, or vice versâ. The breech end of the barrels may be made to enter annular recesses in the false breech, or vice versa. Instead of an eccentric hinge pin, pinion teeth gearing with rack teeth on the barrel may be employed.

[Printed, 10d. Drawing.]

A.D. 1860, May 7.—N° 1131.

ROBERTS, MARTYN JOHN.—(*Provisional protection only.*)—
“Improvements in breech-loading fire-arms.”

A plug is to be fitted in the breech of the gun sufficiently large to contain a charge chamber. When the plug is raised from its place in the gun the charge is to be inserted in a recess in the plug, which is then replaced, the recess then being in a line with the bore of the gun. Sufficient thickness of metal is to be left behind the charge chamber.

[Printed, 4d. No Drawings.]

A.D. 1860, May 10.—N° 1153.

GEDGE, WILLIAM EDWARD.—(*A communication from Joseph Humbertjean and Charles Matthey.*)—(*Provisional protection only.*)
—“Improvements in breech-loading fire-arms.”

The barrel of the breech-loader is to be hinged, and to be secured by means of a bolt placed underneath the breech, and urged by a spiral spring towards the butt end of the gun, and extending beyond the break-off. When the piece is to be charged, the bolt is to be pushed back by a lever action worked by a trigger.

[Printed, 4d. No Drawings.]

A.D. 1860, May 11.—N° 1168.

WILSON, THOMAS.—“Improvements in projectiles and cartridges for fire-arms and ordnance.”

A cylindrical recess is made in the rear of the projectile, extending little more than half its length. The recess is filled with a wooden plug, “made flush with the end of the projectile.” The projectile may be made tubular, and be fired with a metal disc behind its base. For smooth-bore guns the tubular passage may be made of a spiral form to give rotation. A varnish is used to

protect the lead of a projectile from the action of the lubricating grease. Beeswax and oleine, or stearine and oleine, are used as a lubricant. Instead of oleine, olive or almond oil may be used. A thin metal disc is attached to the wad of the cartridge.

[Printed, 8d. Drawing.]

A.D. 1860, May 17.—N° 1210.

KRUTZSCH, WILLIAM.—“Improvements in mortars.”

An annular recess is formed in the interior of the mortar near its muzzle. A ring of soft metal is fitted into this recess. “After igniting the charge the explosive power of the powder is accumulated, until it proves sufficient to drive the projectile and a portion of the metal ring through the bore.” A “greatly increased flight” is to be thus obtained.

[Printed, 8d. Drawing.]

A.D. 1860, May 21.—N° 1250.

BAKER, VALENTINE.—(*Provisional protection only.*) —“Improvements in breech-loading and other ordnance.”

The gun is to be made by rolling a heated sheet of metal upon a steel or cast-iron tube; the sheet may be made thicker at the breech end of the gun. The breech is to be closed by a wedge-shaped breech piece, made to slide transversely across the bore of the gun.

[Printed, 4d. No Drawings.]

A.D. 1860, May 23.—N° 1278.

HEPPLESTON, THOMAS.—“An improvement or improvements in breech-loading fire-arms, and in projectiles to be used therewith.”

An oblong aperture or box is made in the upper part of the breech end of the barrel to receive the charge. When the charge is inserted a cylindrical breech plug attached to the hinged lid of the box is made to enter and fit the aperture, being held in its place by a screw.

The projectile is made with ribs, raised upon its surface, between which the lubricant is held. In the case of muzzle-

loading guns the projectile is forced through a hoop whose periphery is of the same size and shape as the rifled bore.

[Printed, 8d. Drawing.]

A.D. 1860, May 23.—N° 1282. (* *)

DUCLOS DE BOUSSOIS, FRANÇOIS JOSEPH EDOUARD.—
(*Provisional protection only.*)—"This invention relates to an
" improved system or mode of manufacturing tubular metal
" articles, such, for example, as hollow axles, shafts, gun barrels,
" and masts, and consists essentially in the substitution of cast
" steel for wrought iron in such manufacture. In making a
" hollow axle or tube, according to this invention, it is proposed
" to prepare a block of cast steel of an annular form, the weight
" and dimensions of which are proportioned to the weight and
" dimensions of the hollow cast-steel axle or other article to be
" produced. This cast-steel ring having been heated to a welding
" heat, is placed on a mandril, and rolled thereon between a pair
" of rolls, according to the manner described in the Specifications
" of Mr. James Edward McConnell's Letters Patent of the 28th
" August 1851, No. 13,729, and the 24th June 1852, No. 14,182."

[Printed, 4d. No Drawings.]

A.D. 1860, May 24.—N° 1291.

PRINCE, FREDERIC WALLER.—"Improvements in fire-arms
" and ordnance."

In breech-loading fire-arms, where the barrel is turned down to receive the charge, "a tube with a quick threaded female screw is
" attached with a knuckle or eccentric joint to the under part of the
" breech end of the barrel; a corresponding male screw is secured
" on a pivot, to a frame under the breech end of the barrel, and,
" on turning the said male screw by means of a lever attached
" thereto, the breech end of the barrel is moved up and down."
Where a hinged charge chamber is employed a similar arrangement may be applied. "The point of contact between the
" chamber and the barrel may be countersunk," and a tight joint is made by using a bushing of copper or a ring of steel. "A
" self primer may be made of the chamber gun, by causing the
" nipple to come opposite a reservoir of caps when the chamber is
" opened."

A jointed lever may be used for a breech-loader in the place of an "ordinary break-off," when raised it "draws back a piston and "opens a cavity sufficiently to insert the cartridges, and by pushing the lever back," the piston and cartridge are pushed into the barrel.

For breech-loading ordnance a hinged breech piece is used; the breech is closed by a screw plug, which screws through the breech piece into the end of the barrel. The cartridge may be of the ordinary kind, or have a metal case. For muzzle-loading guns a lever or wheel and pinion attached to the muzzle may be employed for forcing in tightly fitting projectiles. A lever may be used with a rammer formed with ratchet teeth.

[Printed, 10*d*. Drawing.]

A.D. 1860, May 25.—N^o 1293.

WADDELL, CHARLES DOUGLAS.—(*Provisional protection only.*)—"Improvements in ordnance and fire-arms, and in the application and arrangement of the propelling agents with which they are charged."

In order to communicate to the projectile a gradually increasing velocity, instead of acting upon it suddenly, the propelling charge is to consist of several qualities of powder. The portion of the charge placed in front is to be ignited first, and to consist of slowly burning powder, that placed next is to be a more quickly burning powder. Additional windage grooves are to be cut in the bore of the barrel.

[Printed, 4*d*. No Drawings.]

A.D. 1860, May 25.—N^o 1295.

MACINTOSH, JOHN.—"Improvements in breech-loading fire-arms, ordnance, cartridge, and projectiles."

The hammer is so constructed that part of it is made to close the breech end of the barrel, while the other part ignites the primer. A thick plate of metal projects from the under side of the hammer behind the striking part, and fits into a recess in the under side of the breech, the upper side being cut away.

Cartridges are formed "of gun cotton covered with a skin of "collodion;" they are impervious to moisture, and leave no residue. For hollow projectiles, suited for consecutive firing as

described in prior Specifications (see No. 633, A.D. 1852; No. 14,041, A.D. 1852), a hard wood washer is used to separate the projectiles, and is furnished "with a fuse composition in the form of a V. A cone of combustible material, consisting of gutta percha and inflammable compounds, may be inserted in a cavity formed in the rear of the projectile, and give increased range.

[Printed, 4d. No Drawings.]

A.D. 1860, June 2.—N° 1357.

LANCASTER, CHARLES WILLIAM, BROWN, JAMES, and HUGHES, JOHN. — "Improvements in cannon and other "ordnance."

In constructing ordnance on the built up system of construction a jacket is employed, which forms "a longitudinal truss or "brace." By preference "this truss should extend from the "breech or rear end to a small distance in front of the trunnions" of the gun. The exterior of the breech end of the gun is turned to receive the jacket, and a shoulder is formed on the rear end of gun, behind which the jacket is made "to fit and take its "hold." The jacket may be made in two or more parts, and be shrunk on; it may be used in combination with cylindrical hoops or rings.

[Printed, 6d. Drawing.]

A.D. 1860, June 5.—N° 1375.

RICHER, FRANÇOIS CHARLES.—(*Provisional protection only.*) — "Improvements in breech-loading fire-arms and in their car- "tridges."

A sliding "drawer with two chambers for receiving the car- "tridges" is to be applied to breech-loading guns. It is to be moved by a lever underneath the gun. Fulminating powder is to be attached to the cartridges, so that they may contain their own ignition.

[Printed, 4d. No Drawings.]

A.D. 1860, June 15.—N° 1464.

HARDING, WILLIAM.—"Improvements in breech-loading fire- "arms."

Breech-loading guns, which may also be used as muzzle loaders, are made with a moveable breech which is placed between the barrel and the false breech. The moveable breech is "percussioned," and turns on centres to "admit cartridges to the barrels, which are themselves moveable on the stock and capable of turning down, . . . and are so placed as to leave the breeches free so to move." A tight joint is made by a ring of platinum or other metal. The barrels are locked in their place, when the breeches are closed by means of a bolt placed underneath and entering into the false breech.

[Printed, 10*d*. Drawing.]

A.D. 1860, June 20.—N° 1498.

SIMONS, FRANCIS CONSTABLE.—(*Provisional protection only*).—"Improvements in ordnance."

In order to clean out the gun effectually after it is fired, an opening of a rectangular or other shape is to be made in the breech end of the gun.

This opening is closed by block worked by a screw. After the gun is fired a greased wad is to be passed through the barrel, being introduced through the opening and pushed to the muzzle, or if preferred from the muzzle to the breech. The opening is then closed and the piece is charged.

[Printed, 4*d*. No Drawings.]

A.D. 1860, June 21.—N° 1504.

MUNN, WILLIAM AUGUSTUS.—"An improved cartridge pouch."

The cartridges are attached by loops to a strap which is coiled inside the cartridge pouch or case, round a centre pin, "like the main spring of a watch." As the strap is drawn out the cartridges may be removed singly as required.

In some cases a revolving case may be placed inside the cartridge pouch, and the cartridges are placed in suitably arranged compartments in the case.

[Printed, 10*d*. Drawing.]

A.D. 1860, June 28.—N° 1570.

RICHARDS, WESTLEY.—"Improvements in ordnance, also in cartridges and cap holders."

In constructing ordnance "two or more tubes of wrought iron " or steel " are placed "concentrically one within the other," and the space between them is filled "by running in gun metal or " steel in a liquid state." In making cartridges for small arms the base of the cartridge is made of double thickness of paper turned over so as to form a cup.

For cartridges for breech-loaders "a wad made of a soft woven " fabric" is used instead of the "hard felted fabric." A tube of vulcanised india-rubber or other elastic substance is used for holding caps and enabling them to be easily placed on the nipple of the gun or rifle.

[Printed, 8d. Drawing.]

A.D. 1860, June 29.—N° 1574.

WILSON, THOMAS.—"Improvements in breech-loading fire-
" arms and ordnance and in cartridges."

The breech is closed by a block or "tongue piece," moving in a vertical plane on a hinge; it is fixed when in its place by a screw working through the block, and turned by a handle in the rear of the breech; the screw pushes forward a moveable plug which fits in the breech end of the barrel. In some cases the charge chamber is formed in the hinged block. For breech-loading ordnance a breech block is used which slides vertically in a slot cut in the gun, and is fixed in its place by a screw passing through the block into the breech of the gun, and turned by a wrench.

Cartridges for breech-loaders are made with the powder placed in front of the projectile and wad, which are left behind at each discharge, and are propelled by the powder of the cartridge next inserted. Consolidated powder on "Captain Brown's" method may be used.

Petroleum oil and stearine or beeswax are used as lubricants.

[Printed, 10d. Drawings.]

A.D. 1860, June 29.—N° 1578.

HALE, WILLIAM.—"Improvements in impelling shells or shots,
" and in apparatus for directing their flight from ships or vessels,
" which apparatus is applicable to guns or mortars used on board

“ ship for preventing them being acted upon by the pitching or rolling of the ship or vessel.”

A metal cylinder is attached to the projectile and is charged with a compressed combustible mixture, so as to act like a rocket in propelling the projectile.

The projectiles are discharged from a frame which is suspended on the principle of a pendulum when used upon the water.

[Printed, 10d. Drawing.]

A.D. 1860, July 3.—N° 1605.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Heinrich Joachim. Natorp.*)—(*Provisional protection only.*)—“ An improved fabric suitable for holding charges of gunpowder.”

The “ improved fabric ” is to be made by “ weaving a fabric from silk fly and silk noils and other like products from waste silk.” The fabric “ will not readily burn or smoulder, especially when any portion is left in a gun after firing a charge.”

[Printed, 4d. No Drawings.]

A.D. 1860, July 3.—N° 1610.

BRAYNARD, THOMAS L.—(*A communication from John J. Walsh.*)—“ Improvements in apparatus for working, training, and levelling cannon on board of vessels, and in fortifications, redoubts, and other places.”

The improvements “ consist in arranging a supporting and propelling wheel under the breech of the gun, and connecting therewith a hand wheel like a steering wheel, so that by such wheels the gun may be run out or in or trained sideways.” In combination with these wheels a geared sector is fitted to the breech of the gun to enable it to be elevated or depressed. The supporting wheel is “ pivoted on a screw, so that it will elevate or drop the carriage as required.”

[Printed, 8d. Drawing.]

A.D. 1860, July 4.—N° 1622.

BLAKE, JOHN.—(*Provisional protection only.*)—“ Improvements in the manufacture of guns and fire-arms of steel.”

The improvements are said to consist "in employing mandrils made in sections longitudinally, between which sections paper or other material is placed, which paper or material being injured by the heat allows of the mandrils being withdrawn after the guns or barrels of fire-arms have cooled."

[Printed, 4d. No Drawings.]

A.D. 1860, July 6.—N^o 1639.

DOUBLET, THOMAS.—(*Provisional protection only.*)—"Improvements in rifles and other fire-arms."

The back sight of a rifle is to be made with a number of holes "arranged on the principle of a stadium," by observing which hole corresponds to an object of known height, as a man, the distance may be judged. The foresight is made "in the form of a ring," and the object aimed at "is brought into the centre of it." For persons of defective vision the apertures may be made large, and each aperture may be fitted with a suitable lense.

[Printed, 4d. No Drawings.]

A.D. 1860, July 13.—N^o 1687.

PARSONS, PERCEVAL MOSES.—(*Provisional protection only.*)—"Improvements in ordnance and fire-arms, and in tools for rifling the same."

The outer casing of the gun is to be made of cast iron bored out in a cylindrical or slightly conical form. Inside the cast-iron casing is forced "a tube of wrought iron, steel, homogeneous metal, or other suitable metal, or alloy, turned to fit the interior of the cast-iron casing."

In large guns two or more internal tubes of suitable metals may be employed, the smaller tube being fitted in the larger. Breech loading guns are to be made with a plug breech, having lugs fitting in an annular recess. A ring or flange of copper may be used with the plug to make a tight joint. For rifling barrels a cutting tool of steel, of a cylindrical form, and having "angular teeth" which "form the cutting edges," is employed. For the finishing tool "a cylinder of steel highly polished without cutting edges" is used.

[Printed, 4d. No Drawings.]

A.D. 1860, July 13.—N° 1688.

EDGE, JOHN WILLIAM.—“Improvements in rifled fire-arms, guns, and ordnance.”

In rifling fire-arms the bore is made of a sectional figure in the form of a polygon, “with sides forming obtuse angles with each other or with sides of a curved shape.” In the latter case the parts corresponding to lands present a convex curved surface to the bullet.

[Printed, 8d. Drawings.]

A.D. 1860, July 13.—N° 1691.

RISSE, FRANCIS JOSEPH.—(*Provisional protection only.*)—“Improvements in gun locks.”

The sear plate of the lock is to be made “out of a circular plate of metal,” and notches are “filed therein into which takes a small catch lever, acting by a spring, for cocking the gun and holding the hammer either at a half or full cock.” The sear plate fits on the square part of the pin which carries the hammer. A spiral spring may be used instead of the long V-shaped spring ordinarily used “for acting on the sear plate of the lock, by which” the lock plate is shortened one half.

[Printed, 4d. No Drawings.]

A.D. 1860, July 14.—N° 1704.

DE NEVIERS, ALBRECHT.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms.”

Self-acting charging apparatus is to be fitted in the stock. The cartridges are placed in a tube, and by the action of the lock when placed at half-cock a cartridge is released, which is allowed “to fall or slide into the breech chamber,” while all the other cartridges are held back in their place. A spring cap is used to close the “channel containing the cartridges.” If a needle gun is used the needle is projected through the back of the charge chamber, the aperture being closed so as to prevent escape of gas.

[Printed, 4d. No Drawings.]

A.D. 1860, July 17.—N° 1723.

BLOAG, HENRY.—“Improvements in breech-loading fire-arms and cannons.”

The breech chamber is formed in a moveable piece that turns “on axes at or near its centre, such axes being supported and

“ carried by the sides of a slotted frame or case ” connected by side pieces to the stock and the barrel. The breech piece is made to turn up to receive the cartridge, which is ignited by a nipple fixed in the breech piece. The end of the breech chamber is forced tightly against the end of the barrel by means of a breech screw.

[Printed, 1s. 4d. Drawings.]

A.D. 1860, July 17.—N° 1733.

VALLANCE, PHILIP.—“ Improvements in the construction of “ telescopic sights for rifles and other fire-arms and ordnance.”

A telescopic sight is attached to the barrel of the gun or rifle, “ the lenses being simply placed at a suitable distance the one “ from the other, and the space between them unenclosed.”

Also a telescopic sight, “ constructed on the Galilean principle,” is employed. For the fore sight a tube containing the cross wires is used, and immediately behind the wires is placed a convex lens. For the back sight a plate or disc having a perforated aperture is employed. Near or on this perforated disc a concave lens is placed, so as in combination with the lens of the fore sight to form a Galilean telescope.

[Printed, 8d. Drawing.]

A.D. 1860, July 18.—N° 1740.

OXLAND, ROBERT.—“ Improvements in the manufacture of “ gunpowder.”

Refined nitrate of soda is used instead of saltpetre or nitrate of potash in the manufacture of gunpowder. Crude nitrate is ground to powder and placed in an inverted conical vessel with a perforated bottom, and water is poured through ; “ a saturated solution of pure nitrate is then applied, and allowed to pass slowly “ through.” The mass is drained, and then dissolved in water by the aid of steam to form a saturated solution, to which a solution of pure carbonate of soda is added as long as a precipitate is produced. From this a pure powder is obtained by evaporation. The following proportions are used to form gunpowder :—

Nitrate of soda	-	-	-	85 parts.
Sulphur	-	-	-	16 „
Charcoal	-	-	-	18 „
Coal or dust	-	-	-	20 „

[Printed, 4d. No Drawings.]

A.D. 1860, July 18.—N° 1743.

HUNT, JAMES.—“Certain improvements in hair triggers or “detents for single or double barrelled guns or pistols.”

Hair triggers or detents are made “more positive and certain in their action” by the introduction “of an additional weak or fine spring and dog,” which prevents any freedom or looseness in the parts unless relieved by the trigger in the usual way.

[Printed, 8d. Drawing.]

A.D. 1860, July 21.—N° 1768.

HOLLIS, EBENEZER.—“Certain improvements in muzzle-loading guns applicable for military and sporting purposes, parts of which are also applicable to certain descriptions of pistols and breech-loading guns, as also in the manner of fixing or connecting bayonets to military guns.”

Heel plates are made with a strap at the toe end extending two or three inches, and let into the toe of the stock so as to give additional strength. The joint of the cover or lid of the recess in the heel plate is so made that the axis is hidden from view.

“Screw or side pin cups” are formed with “a strap or straps for receiving a screw or screws,” by which the cup is secured to the stock, and the liability of the cup to fall out is prevented. “A compensating seat” is provided for “the seer of the lock to rest on,” and is attached “to the lower edge of the trigger blade.” A safety stop is fixed on the lock plate to prevent accidental explosion. The “back sight” is made with graduates, “so shaped that the slide requires no exact place for resting on them.” The “lower band” is made in three parts, hinged together, the middle band in two parts; the top band is made of steel, but of the ordinary shape. The “ramrod” is held in its place by a spring whose bead presses out and projects over the bead of the rod.

A lever “detent” is used for fastening a bayonet, so arranged that the hand presses on the lever and allows the bayonet to be turned a quarter round, and be then “slid off perpendicularly.”

[Printed, 1s. Drawing.]

A.D. 1860, July 24.—N° 1786.

HARRISON, EDWARD, BRADBURY, WILLIAM, and BUCKLEY, JAMES.—(*Provisional protection only.*)—"A certain improved compound or compounds to be used as a substitute for gunpowder."

An explosive compound, intended as a substitute for gunpowder, is proposed to be made by mixing—

"Saccharum (saccharine matter)	-	50 parts.
Nitrate of potash	-	48 parts.
Club moss (<i>lycopodium clavatum</i>)	-	2 parts."

The powder so produced is to be used "for blasting purposes."

[Printed, 4d. No Drawings.]

A.D. 1860, July 25.—N° 1808.

ROSE, WILLIAM.—"Improvements in breech-loading fire-arms and ordnance."

The breech end of the barrel or barrels of the gun is "raised from the stock by means of a screw and lever or eccentric." "A screw box is attached to the under side of the barrel," which contains "a small stud working in the thread of a quick screw, to which a lever is secured." A slotted stud "secured to the barrel passes through the fore end of the stock," into which a bolt upon the lever engages, and so secures the barrel in its place.

A similar arrangement for loading at the breech is applied to ordnance.

[Printed, 1s. 6d. Drawings.]

A.D. 1860, July 27.—N° 1828.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms and ordnance."

The breech end of the barrel is elongated, and is to be closed by a sliding plug, which opens or closes an aperture in the top of the barrel, through which the cartridge is inserted.

The barrel is to be rifled by making each groove to consist "of a concave flute, one edge of which is in the smallest diameter of the barrel, the other edge of the said flute or groove being

"more distant from the axis of the barrel." The transverse section of the barrel has "nearly the figure of a ratchet wheel."

[Printed, 4d. No Drawings.]

A.D. 1860, August 2.—N° 1868.

GRANT, JOHN.—(*Provisional protection only.*)—"Improvements in breech-loading guns."

The gun is to be bored through, and a conical aperture made "across the gun, near the rear end," and closed by "a correspondingly formed breech plug." The plug is locked in its place by means of lugs.

[Printed, 4d. No Drawings.]

A.D. 1860, August 2.—N° 1872.

HADDAN, JOHN COOPER.—"Improvements in the manufacture of rifled cannon and of projectiles to be discharged from rifled cannon."

Rifled guns, intended to fire projectiles with soft metal rear parts which are expanded into the grooves, are rifled only from the muzzle to a short distance in front of the charge chamber. The grooves may be made very shallow at the breech end, and deepen as they approach the muzzle. The ordinary spherical shot may be converted into elongated shot by bolting them together. A jacket may be attached having projections or swellings that take into the rifle grooves. Pointed peaks, caps, or fronts are added to or fixed upon flat-fronted projectiles. Flat-headed shot are made exclusive of the added head or front, "about one diameter in length, with but little metal at the ends, and leaving the mass of metal at the sides."

[Printed, 10d. Drawings.]

A.D. 1860, August 6.—N° 1900.

JEFFRIES, GEORGE.—"Improvements in machinery or apparatus for filling cartridges."

Portable charging apparatus suitable for charging ordinary sporting cartridges is made of a frame which may be attached to a table by a screw clamp; it consists of a "vertical standard, the

“ lower part of which is grooved semicircularly to admit the “ cartridge case.” The upper “ part of the standard is provided “ with a rammer and loose box,” into which “ the filled cartridge “ is introduced for the purpose of having its edge turned inwards, “ so as to secure the wadding in its place. This is effected by a “ screwed plug working in a bush in the end of the box. A “ plunger works inside the screwed plug,” and drives out the completed cartridge.

[Printed, 8d. Drawing.]

A.D. 1860, August 13.—N° 1955.

HEWETSON, HENRY.—“ Improvements in rockets and in “ apparatus for discharging the same.”

Three or more rockets are attached “ around a tube, on the “ hinder part of which there are spiral blades, against which the “ fire from the rockets acts in such a manner as to cause the “ series of rockets to rotate ;” or the tube “ may be placed in “ the centre of a single rocket,” and its fire be made to act upon the spiral blades. The rockets are discharged from a sliding cylinder frame, so connected with the central tube that rotation is imparted to the rockets as they begin to move.

[Printed, 10d. Drawing.]

A.D. 1860, August 13.—N° 1958.

GREENWOOD, THOMAS.—“ Improvements in the construction “ of projectiles.”

Elongated projectiles for rifled guns are cast with an annular recess upon their surfaces, upon which “ packing rings of felt, “ canvass, or other suitable fabric are applied.” The packing prevents windage, and is forced into the rifle grooves to give rotation to the projectile. The packing, which may be lubricated, “ is formed after the manner of the leather packing of an “ hydraulic press, the object being that it shall expand under the “ pressure of the gases ” generated by the exploded charge.

[Printed, 8d. Drawing.]

A.D. 1860, August 16.—N° 1984.

BENTLEY, JOSEPH, and BENTLEY, DAVID.—(*Provisional protection only.*)—“ Improvements in breech-loading fire-arms.”

In the breech end of the barrel "a slot or mortice" is to be formed, in which "a sliding breech works up and down or transversely." It is to be actuated by a lever, and a "cradle piece" is to be used, "on which the cartridge is laid, and is pushed forward into the barrel by the thumb." The sliding piece then is moved by the lever, and closes the breech.

[Printed, *4d.* No Drawings.]

A.D. 1860, August 17.—N° 1991.

MOLE, ROBERT, and MOLE, FREDERICK MAJOR.—"An improvement or improvements in the manufacture of matchets and cutlasses."

The blades of matchets and cutlasses are "finished by coating them with zinc" in the way ordinarily practised in coating iron articles. Grinding may be dispensed with, but where a specially smooth surface is needed, the surfaces may be ground before they are coated. The coating protects the surfaces from rust.

[Printed, *4d.* No Drawings.]

A.D. 1860, August 18.—N° 2005.

GRAHAME, THOMAS.—"Improvements in projectiles and cannons, or barrels for discharging the same."

The projectile is made hollow, and of such a size and shape that it may be fitted upon the exterior of the barrel in which the propelling charge is exploded. Rotation may be given to the projectile by rifling its interior of a shape corresponding to the exterior of the discharge barrel.

[Printed, *4d.* No Drawings.]

A.D. 1860, August 22.—N° 2021.

DANA, EDWARD AUGUSTUS.—(*A communication from John P. Schenkl.*)—"Relating to ordnance as well as fire-arms."

In order to avoid straining the gun by allowing the full charge of powder to explode and act upon the projectile while in a state of rest, the charge is to be divided into two parts. The main propelling charge is attached by a cartridge to the rear of the projectile round a projecting stem. At the end of the stem is the small starting charge, enclosed in a case of about the diameter of

the stem, and extending beyond the main charge. A recess is formed in the breech of the gun corresponding in size to that of the case of the starting charge. When the cartridge is charged in the gun, the starting charge is first exploded in the recess in the breech and starts the projectile from rest ; as it is propelled from the breech the main charge is ignited, and imparts additional velocity to the projectile.

[Printed, &c. Drawing.]

A.D. 1860, August 25.—N° 2048.

DAVIES, GEORGE.—(*A communication from William Rice.*)—
“ Certain improvements in the construction of bomb shells.”

An “ oblong or spherical shell ” is made by charging it with “ a system of partially severed rings or strips of cast iron, arranged within the shell round a chamber containing gunpowder or other explosive compound,” which break up and scatter when the shell is exploded.

Shells intended to be fired from a smooth bore are made with a hollow cylinder, fitted on the central part, air passages being formed in the hollow cylinder to give rotation.

For rifled projectiles sabots of suitable soft metal are employed. Percussion fuses are used to ignite the bursting charges.

[Printed, &c. Drawing.]

A.D. 1860, August 27.—N° 2059.

CLARK, WILLIAM.—(*A communication from Charles Claude Etienne Misié.*)—“ Improvements in fire-arms.”

A short rifled barrel is attached to or filled in a long stock. The cap is exploded by means of a striker acted upon by a long rod connected with the trigger. The elevating sight is let into the wood of the stock behind the barrel.

[Printed, &c. Drawing.]

A.D. 1860, August 30.—N° 2097.

JONES, JOSIAH.—(*Provisional protection only.*)—“ Improvements in gun carriages.”

The gun carriage is to be so made that the various changes in elevation and direction may be made by altering the position of

the rear part of the gun while the muzzle is retained in, or nearly in, the same position. Small portholes may be used with gun carriages so made. The bearings of the guns are to be made to rise and fall or move sideways by means of suitable adjusting apparatus.

[Printed, 4d. No Drawings.]

A.D. 1860, August 31.—N° 2102.

RICHARDSON, GEORGE. — (*Provisional protection only.*)—"An improved instrument to be used for ascertaining distances."

An instrument to be called "a telometer" is to be attached as an aperture sight to a rifled gun. The size of the aperture is to represent the height of a known object as it appears at a known distance. By looking at the object aimed at through the aperture, and estimating the apparent height, its distance may be judged.

[Printed, 4d. No Drawings.]

A.D. 1860, September 1.—N° 2113.

PILON, MARTIN REGUL.—"Improvements in the manufacture and construction of fire-arms, and in the means of loading the same and controlling more effectually the action of the fire-lock."

The improvements relate to the construction of the lock, and means of effecting the discharge. The touch-hole and nipple are formed at the breech end of the barrel. The cap is discharged by means of a piston rod, having a hammer on its head, and moving in a line with the axis of the bore. The piston is actuated by a coiled spring, which is compressed when the piston is drawn back, and held by a detent. The detent is released by the trigger, and so fires the charge.

[Printed, 6d. Drawing.]

A.D. 1860, September 6.—N° 2157.

HERRING, GEORGE, and LICHTENSTADT, DAVID.—(*Provisional protection only.*)—"Improvements in treating a certain substance to obtain textile fibres and materials for paper-making, and charcoal for gunpowder, pyrotechnic, and other purposes."

AMMUNITION, AND ACCOUTREMENTS. 121

The bark and wood of the mulberry tree are proposed to be employed, the bark for making paper, and the wood for charcoal for making gunpowder. The bark is boiled in a solution of caustic soda, washed and cleansed, and then treated with a solution of sulphate of soda. The wood, minus the bark, is "cut into convenient lengths, and converted by dry distillation in close iron cylinders into charcoal" suited for being made into gunpowder.

[Printed, 4d. No Drawings.]

A.D. 1860, September 12.—N° 2200.

BAILLIE, BENJAMIN.—(*Provisional protection only.*)—"An improved rifle range."

The sides and roof of the range are to be made of "palisades of flat iron or corrugated and galvanised." The targets are to be swung on pivots at the sides to facilitate the marking and obliteration of the hits.

[Printed, 4d. No Drawings.]

A.D. 1860, September 15.—N° 2249.

BARNWELL, STEPHEN, and ROLLASON, ALEXANDER.—"Improvements in combining and mixing certain solutions of pyroxylyene with animal, mineral, and vegetable substances, by which its quality is altered in such manner as to produce hard, resistant, adhesive, plastic, or resilient compounds and articles unalterable in their nature, and varied in colour, which said compounds in a state of solution may also be advantageously employed as paints or varnish."

Pyroxylyene or gun cotton is dissolved in any of its known solvents, and may be combined with various plastic substances and be moulded into any required shapes, or it may be used as varnish. It is employed in the manufacture of gunpowder, dry pyroxylyene being reduced to powder, and "employed in the place of or in conjunction with charcoal." This "adds to the strength of the gunpowder" and "avoids residuum."

[Printed, 6d. No Drawings.]

A.D. 1860, September 17.—N° 2255.

WALSH, JOHN HENRY.—"Improvements in breech-loading fire-arms."

A perforated plug, similar in construction to the plug of a stop-cock, is used to close the breech end of the barrel. Behind the plug a chamber is formed in the stock of breech-loading fire-arms; the charge is inserted in the chamber, and the perforated plug is turned by a handle, so that its perforation coincides with the bore of the barrel, the cartridge or charge is pushed forward, and the plug is partially turned on its axis to close the breech. A wad of solid wax or other lubricant is placed behind the powder.

[Printed, *8d.* Drawing.]

A.D. 1860, September 18.—N° 2265.

GOLDEN, CHARLES.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms and in projectiles."

The breech of the gun is to be closed by means of a "bolt or plug mounted on a guide pin, fixed in a side piece, which is hinged by a knuckle joint to the barrel, capable of opening and closing into a recess formed in the breech thereof." An adjustable sight moved laterally "by a screw placed at right angles to the barrel may be employed. A broad groove is to be made in the surface of the projectile to receive grease or other lubricant."

[Printed, *4d.* No Drawing.]

A.D. 1860, September 19.—N° 2281.

ZORN, FRIEDRICH WILHELM JULIUS.—(*A communication from Henry Genhardt.*)—(*Provisional protection only.*)—"Improved apparatus for charging and closing the ends of cartridges."

Self-acting charging apparatus is to be employed in charging cartridges; it may be made either portable for the use of sportsmen, or on a larger scale for manufacturing purposes.

The cartridge is first charged with powder and shot and suitable wadding discs, it is then placed in a socket, and a sliding plunger is made to press down upon the charge, and force it tightly in the cartridge case. The cartridge is then removed, and another filled cartridge is put in its place. The filled and pressed cartridge is to be afterwards replaced in the machine, and the open end closed down by the action of a die that folds over and presses down the edges at the other end of the cartridge.

[Printed, *4d.* No Drawings.]

A.D. 1860, October 4.—N° 2405.

JONES, MICHAEL.—(*Provisional protection only.*)—"Im-
"provements in rifles & other fire-arms whereby to ensure
"greater accuracy in the use of the sights."

A spirit level is to be fitted to the barrel of the rifle, being placed across the stock so that it is visible to the eye while aim is being taken.

[Printed, 4d. No Drawings.]

A.D. 1860, October 8.—N° 2427.

PARIS, MATTHEW.—(*Provisional protection only.*)—"Improve-
"ments in fire-arms."

Instead of the ordinary trigger used in fire-arms it is proposed to employ a projecting stud, which is pressed into a recess to effect the discharge. The stud will not be liable to be accidentally discharged in the same way as the ordinary trigger.

Where moveable sights are used the descent of the hammer is to be made to fold down the sight.

[Printed, 4d. No Drawings.]

A.D. 1860, October 9.—N° 2447. (* *)

PRICE, GEORGE.—(*Provisional protection only.*)—"An improve-
"ment in the manufacture or construction of metallic armour for
"vessels of war, land defences, shields for ordnance, mantellets,
"&c." The invention "consists of combining steel and wrought
"iron in such a manner as when formed into plates or slabs for
"the outer covering of the sides of vessels of war, or for the
"casing or covering of land defences, or for shields for ord-
"nance, or for mantellets, or any other kind of defences for the
"resistance of shot or shell fired from any description of ord-
"nance, that the said plates or slabs of combined steel and
"wrought iron shall the better resist breakage or penetration by
"shot or shell than either steel or wrought iron when used singly
"and alone. I produce wrought-iron plates or slabs with a
"surface of steel on one or both sides, and of any required
"thickness, in the course of their manufacture, i.e., by piling the
"iron and steel together to form the 'pile' or 'billet' of which
"the plate or slab is produced by passing through the rolls.
"Any desirable kind or quality of steel may be used, and the

"hardening of the steel surfaces may be effected by any of the usual methods employed in hardening steel."

[Printed, 4d. No Drawings.]

A.D. 1860, October 9.—N^o 2449.

PRICE, GEORGE.—(*Provisional protection only.*)—"An improvement in metallic targets."

Plates suitable for being used for targets are to be made by combining in the same plate a face of steel with an interior of wrought iron. Iron and steel are piled together in such a manner that the combined plate, when passed through the rolls, consists of wrought iron with steel on one or both of its faces.

[Printed, 4d. No Drawings.]

A.D. 1860, October 10.—N^o 2465.

FITZGERALD, DESMOND GERALD. — "Improvements in breech-loading fire-arms."

A moveable breech piece which contains the charge chamber is employed; it lies in a recess formed in the rear of the open breech end of the barrel, and "opens out of the same transversely when a fresh charge is inserted." A lever, which is raised by hand, draws back by the action of a fork the moveable breech piece "clear of the barrel," and "causes it to turn over on a spindle ready to receive a fresh charge." The lever handle is then pulled back, the breech piece is again turned over, and is "wedged tight into the rear of the barrel."

[Printed, 8d. Drawing.]

A.D. 1860, October 12.—N^o 2488.

WILSON, THOMAS.—"Improvements in breech-loading fire-arms, ordnance, and projectiles."

The breech end of a double-barrelled breech-loader is closed by means of a plug "carried by a saddle or breech piece," which "slides on a rib or bar formed by, on, or between the barrels," and is fixed by means of a transverse bolt passed through the saddle or breech piece. The open breech end of the barrels may be closed "by a horizontal block, working in a transverse opening made across the barrels," and moved by a lever; or a sliding breech

plug may be used, which is locked in its seat during discharge, and is withdrawn to admit the charge. In the case of breech-loading ordnance, the breech is closed by a sliding block, working in an opening made transversely in the gun by the action of a screw. Projectiles with their rear parts made in steps are employed; soft metal or other washers are attached to the steps.

[Printed, 1s. Drawings.]

A.D. 1860, October 15.—N° 2514.

SMITH, PETER RECTOR.—“Improvements in fire-arms and “ordnance, and in the projectiles to be used therewith.”

The barrel of the gun is about three feet long; it tapers slightly for about eight inches, then the taper increases for four inches, and then the taper is slight to the muzzle. The barrel is strengthened by affixing to it by means of bands four steel or iron ribs or rods.

The rifle grooves are triangular in shape, and have one turn in 15 inches.

The stock is made hollow, of steel or wrought iron.

The projectiles are about three calibres long with acute conical points, and may be used as solid or shell bullets.

The bayonet is attached to the barrel over the steel rods by means of a spring, which is released by pressing it.

[Printed, 10d. Drawings.]

A.D. 1860, October 16.—N° 2517.

BURNETT, CHARLES JOHN.—(*Letters Patent void for want of Final Specification*).—“Improvements in breech or muzzle loading “ordnance.”

Long projectiles of three or five diameters in length are to be fired from a gun of small calibre relative to the weight of projectile, and made of sufficient length to consume the full powder charge required.

The projectile is to be cylindrical and pointed at one or both ends, and to be made of lead or hard alloy, with pointed iron ends, or of malleable iron or iron coated with lead.

[Printed, 4d. No Drawings.]

A.D. 1860, October 17.—N° 2533.

SEAR, WILLIAM.—“Improvements in cartridges.”

The powder charge in the cartridge is ignited at or near its fore end. This is effected by screwing into the base of the cartridge an ignition tube, communicating with the percussion cap, and extending through the powder charge nearly to the base of the wad in front of it. The fire is thus communicated to the front part of the powder charge. In shot cartridges the small shot is surrounded by a metallic cap, or loose band of any suitable fabric, to prevent the shot from unduly spreading.

[Printed, 6d. Drawing.]

A.D. 1860, October 24.—N° 2593.

TAYLOR, WILLIAM ROWLAND.—“Improvements in rifle ‘belts.’”

A spring composed of india-rubber, or metal, or other suitable material, is introduced into and made to form part of the ordinary rifle sling or belt. The part of the sling that is nearest to the left elbow during the act of firing is widened, and has an opening made in it to receive the elbow and give steadiness to the rifle during aim and discharge.

[Printed 6d. Drawing.]

A.D. 1860, October 29.—N° 2642.

HARRISON, EDWARD, BRADBURY, WILLIAM, BUCKLEY, JAMES, and GARSIDE, DAN.—“A certain compound or certain ‘compounds to be used as a substitute for gunpowder.’”

The explosive compound is formed by mixing saccharine matter with carbon, sulphur, and club moss, “*lycopodium clavatum*.” Several examples are given of the proportions used for general purposes; the following are given:—

“ Chlorate of potash -	-	-	7 parts.
Starch -	-	-	1 part.
Charcoal -	-	-	1 part.
Sulphur •	-	-	1 part.”

For rifle shooting, the following proportions are given :—

" Chlorate of potash -	-	-	11 parts.
Lycopodium clavatum	-	-	$\frac{1}{2}$ part.
Sulphur -	-	-	2 parts.
Starch -	-	-	1 part.
Charcoal -	-	-	1 part.
Coal or carbon -	-	-	1 part.
Soot from coal -	-	-	$\frac{1}{2}$ part."

[Printed, 4d. No Drawings.]

A.D. 1860, October 31.—N° 2661. (* *)

GHISLIN, THOMAS GOULSTON.—(*Provisional protection only.*)

—" Preparing, applying, and adapting certain articles of vegetable production called eiklonia buccinalis, proteaceæ, juncus, serratus, juncus trista, and amaryllideæ, to further new purposes of manufacture."

" My invention relates to manipulating and manufacturing by chemical and other processes, certain vegetable productions found in and indigenous to South Africa and elsewhere. The first article, a marine plant, which on account of its peculiarity of form I call the algæ triumphata (eiklonia buccinalis of botanist)," embraces "several varieties both solid and hollow."

Amongst other purposes the inventor applies the eiklonia buccinalis as substitutes for "razor and knife handles of every description," "sword, dagger, and stiletto handles, bayonets, swords, and other sheathes;" also "for cowering" [covering ?] and ornamenting "powder, shot, and other flasks."

[Printed, 4d. No Drawings.]

A.D. 1860, November 6.—N° 2713.

LEVERSON, MONTAGUE RICHARD.—(*A communication from William Henry Smith.*)—"Improvements in fire-arms."

Several powder chambers are formed in the breech of the gun, and are made to act successively on the projectile, so as to prevent the gun from being unduly strained. The powder chambers are separated, and stems are attached to or form part of the projectile, and enter into the respective chambers. The powder first fired acts on the centre stem and starts the projectile; then as each

chamber is uncovered by the moving projectile its charge is ignited, and the gases generated aid in propelling the projectile through the barrel.

[Printed, 10d. Drawing.]

A.D. 1860, November 6.—N° 2714.

GREEN, WILLIAM. — “Improvements in fire-arms, breech-loading.”

The breech piece is made conical at its fore end, and “at the back end it is formed with a projection having a slotted hole adapted first to slide and then to turn upon an axis of motion.” The sliding piece is connected “by a link with a lever, by raising which” the breech piece is drawn back, and then raised to admit the charge.

[Printed, 10d. Drawing.]

A.D. 1860, November 6.—N° 2726.

HOWE, ELIAS, the younger.—(*A communication from John Webster Cochran.*)—“Improvements in projectiles.”

Shells are made “by taking a length of tubing, by preference of wrought iron,” and inserting in one end a suitably shaped plug, and filling the other part with perforated discs, leaving a hollow central column, that may be filled with the bursting charge. Corrugated belts of malleable or soft metal are attached to the surface of elongated projectiles. The hollow parts may be filled with lubricating matter.

[Printed, 10d. Drawing.]

A.D. 1860, November 8.—N° 2753.

PRESTON, FRANCIS, and KENNEDY, THOMAS.—“Improvements in projectiles for fire-arms and ordnance.”

A small hole or holes is or are made in conical projectiles “for the escape of air through the axis or other convenient part.”

Projectiles may be made in two or three parts, the fore part being conical and perforated, the hind part being of like shape, and a taper plug being fitted into a recess in the fore part; or a centre expanding piece of soft metal may be used between two conical ends to form a compound projectile.

[Printed, 10d. Drawings.]

A.D. 1860, November 10.—N° 2763.

SPENCE, WILLIAM.—(*A communication from Edward Maynard.*)
—“Improvements in breech-loading fire-arms.”

The improvements relate to the construction of breech-loaders, and a mode of converting muzzle-loaders into breech-loaders.

A portion of the barrel is removed, and the open breech end of the barrel is closed by a hinged block carrying the nipple and opening laterally. The touch-hole is made in the hinged block. The rear end of the barrel is chambered to receive a metallic cartridge containing the powder, which when the powder is fired makes a tight joint, and is withdrawn after the discharge.

[Printed, 8d. Drawing.]

A.D. 1860, November 10.—N° 2768.

WILSON, EDWARD BROWN.—“Improvements in the manufacture of railway wheels, tyres, axles, and points, and crossings, which improvements are also applicable to the manufacture of ordnance, tubes, and metal cylinders generally.”

The invention relates to the manufacture of railway wheels and other articles, and also ordnance, gun barrels, and metal cylinders generally, and “consists in shaping and compressing such articles after they have been cast by the aid of suitable dies acted upon by hydrostatic pressure.”

[Printed, 4d. No Drawings.]

A.D. 1860, November 15.—N° 2801.

UNWIN, PHILIP, UNWIN, JOHN, and ASKHAM, JOHN UNWIN.—“A saloon barrel pistol knife.”

A store of “bulleted caps or cartridges,” containing the ignition primer and propelling charge and bullet is placed in the hollow butt of the pistol. A knife is also attached to the pistol, like a bayonet.

[Printed, 6d. Drawing.]

A.D. 1860, November 15.—N° 2802.

HENRY, ALEXANDER.—“Improvements in rifled fire-arms.”

Various forms of rifle grooves are employed, including “from four to ten planes, angles, and grooves.” The surfaces may be

"formed or arranged in various ways, and, instead of relying wholly upon acute angles, semicircular or curvilinear projections may be produced upon the interior of the bore."

[Printed, 8d. Drawing.]

A.D. 1860, November 15.—N° 2808.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from François Jules Manceaux.*)—"Improvements in sword bayonets and other swords."

Sword bayonets and other swords are made "of a triangular shape, hollowed out or grooved longitudinally, and without a central core," in order that the blade may have great rigidity and little weight.

[Printed, 10d. Drawing.]

A.D. 1860, November 16.—N° 2816.

MOURGUET, JEAN BAPTISTE.—"Improvements in fire-arms and ordnance, and in projectiles used therewith."

"Sharp ridges or projections" are employed for rifling the barrel of a rifled gun "in lieu of hollow grooving, as hitherto practised." The projectile is made with a hollow rear, into which is fitted a plug of wood. The plug is forced into the bullet, and expands its rear and centre part.

[Printed, 10d. Drawing.]

A.D. 1860, November 19.—N° 2837.

VANDENBURGH, ORIGEN.—"Improvements in projectiles to be used in guns and ordnance, and improvements in the appliances for their projection."

Projectiles are made of a form and proportions approximately corresponding to those of the beak, head, and body of a pigeon—Spiral wings or flanges may be employed.

For penetrating and destroying metallic defences a cylindrical bolt is made to project from the central part of the projectile—The body may be made hollow, and used as a shell.

[Printed, 4d. No Drawings.]

A.D. 1860, November 22.—N° 2860.

KEBLE, THOMAS HARMAN.—“Improvements in fire-arms.”

In order to enable the marksman firing a rifle to know if his sights are upright, a level is attached to the piece behind the sight.

“A bar or index is hung on pivots, and it has weights attached to it underneath the points of suspension, so as to keep it in a horizontal position. Just behind the bar is placed or placed a small rectangular screen, made white so as to be easily seen.

[Printed, 6d. Drawing.]

A.D. 1860, November 26.—N° 2901.

OXLAND, ROBERT.—(*Provisional protection only*).—“Improvements in the manufacture of gunpowder.”

In order to make gunpowder waterproof it is proposed to employ, instead of water, in the mixing process a solution of gutta percha or of india-rubber.

In some cases gunpowder that has been made in the usual way with water may be coated by passing the grains of powder through the solution.

[Printed, 4d. No Drawings.]

A.D. 1860, November 29.—N° 2933.

STORM, WILLIAM MONTGOMERY.—“Improvements in the construction of breech-loading fire-arms.”

The improvements are based on those described in the Specification of a prior Patent obtained in the name of A. V. Newton, dated April 1, 1857, N° 907. The chamber is hinged to the breech of the barrel, and turns up and towards the muzzle to receive the cartridge.

In order to prevent the escape of gas, a loose tubular piece, called “a gas check or valve,” is fitted into the hinged charge chamber. The face of the valve that “fits on the rear of the barrel is made concave in profile instead of conical.”

In order to prevent the breech piece from falling out when the locking bolt is withdrawn a spring catch is employed, which takes into a notch in the breech piece or chamber.

[Printed, 10d. Drawing.]

A.D. 1860, December 1.—N° 2954.

SHEDDEN, THOMAS.—"Improvements in ammunition for fire-arms, and in packing the same for transport, and in the apparatus employed therein."

The improvements are based on those described in the Specification of a prior Letters Patent, dated February 13, 1860, N° 389. In making cartridge cases the rear end is formed of a small cylinder of hard wood, or other material, in which is formed a recess at right angles to the axis of the cartridge to receive the percussion cap. The cap is fired by a pin, projecting from the side of the cartridge. To enable the pin cartridges to be packed and transported securely, a protecting piece or block of wood or other material is attached to the cartridge, and has a recess into which the pin enters.

[Printed, 8d. Drawing.]

A.D. 1860, December 4.—N° 2974.

JAQUES, FRANK.—"Improvements or improved apparatus applicable to rifled or other muskets and to other fire-arms."

A cap or tube is attached to the muzzle of a rifle barrel by a hoop or ring, to protect it from injury from collision, "and for obtaining a constant uniformity of the fore sight."

To the hoop or ring or band that encircles the cap or tube or barrel is attached a shield to protect the sight, and a shade to shade it from the sun's rays.

[Printed, 8d. Drawing.]

A.D. 1860, December 5.—N° 2983.

LANCASTER, CHARLES WILLIAM.—"Improvements in sight=
" for rifles and other fire-arms."

The sight is composed of "two parts;" first, "a hinged sight=
" fixed to the side of the stock of the gun;" and secondly, "~~bar~~
" bar, having a movable slide, which is hooked, hinged, or fitted
" to the side of the fore part of the stock, so as to hang on
" depend therefrom."

Tangent sights are made with a bar that "slides laterally as
" well as vertically."

[Printed, 10d. Drawing.]

A.D. 1860, December 7.—N° 2996.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—"Improvements in the manufacture of cannon and of projectiles, part of which improvements is applicable to casting metal."

Moulds intended to be used in casting guns or other articles are to be made of parts which are built up during the process of casting, so that the metal may be "poured from a short height" into the mould. The touch-hole of a gun is made in a line with the axis of the bore, and has a shield affixed to the rear of the gun to deflect the tube of the ignition fuse upwards when it is blown out. Belts of soft metal are attached to the front instead of the rear part of rifle projectiles.

[Printed, 4d. No Drawings.]

A.D. 1860, December 13.—N° 3065.

VANDENBURGH, ORIGEN.—(*Provisional protection only.*)—"Improvements in the breech pieces of breech-loading cannon."

In order to give additional weight to the rear part of breech-loading guns, "so that the inertia of the breech piece may be considerably greater than that of the projectile," a mass of metal "in the form of a long solid boss" is attached to the rear of the breech piece.

[Printed, 4d. No Drawings.]

A.D. 1860, December 13.—N° 3067.

COOPER, JOSEPH ROCK.—"An improvement or improvements in breech-loading fire-arms."

The breech is closed with a sliding plug which is moved by a lever connected with a link to the sliding plug. In order to insure that the lever may be able to withdraw the sliding plug after discharge, a second lever is connected with the first lever, so as to give additional power.

[Printed, 10d. Drawings.]

A.D. 1860, December 13.—N° 3068.

JONES, EMANUEL.—"An improvement or improvements in rifling small arms and ordnance."

Guns are rifled with "a series of concave grooves or flutes having such a curvature and depth that they pass into the cylindrical figure of the bore of the gun without making either angles or convexities between the said grooves or flutes."

Any number of grooves may be used; from three to six are preferred.

For breech-loaders a charge chamber is made with the rear part slightly larger than the fore part.

[Printed, 8d. Drawing.]

A.D. 1860, December 13.—N^o 3069.

REEVES, CHARLES.—"Improvements in breech-loading fire-arms."

The breech of a single or double barrell'd breech-loader is closed by means of "a plug or plate working in an opening or passage made vertically across the breech end" of the barrels. The plug is made to move by means of a quick-threaded screw worked "by a lever on the under side of the fire-arm." A portion of the lever may be made to form the guard.

[Printed, 10d. Drawings.]

A.D. 1860, December 19.—N^o 3121.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from J. D. Duhousset and P. E. Thomas.*)—"Improvements in the treatment of caoutchouc and the employment of a product obtained thereby for lubricating and coating bodies."

A lubricating substance suitable for being used as a lubricator for fire-arms and other purposes, is obtained by heating caoutchouc or india-rubber to a high temperature of from 250° to 460° F. in a close vessel. A viscous semi-fluid substance termed "hévéone" is produced from the heated caoutchouc. In some cases the products given off are condensed by a distillation process.

[Printed, 4d. No Drawings.]

A.D. 1860, December 21.—N^o 3140.

RIGBY, JOHN, and NEEDHAM, JOSEPH.—"Improvements in breech-loading fire-arms and cartridges."

A charge chamber moving on an axis is used; the chamber is moved by a lever, and is made to recede from the breech end of the barrel and turned up or on one side to receive the cartridge, which is inserted in front. In the case of a rifled barrel the chamber is rifled to correspond with the barrel. In making cartridges for breech-loaders a metal lining is used "formed of a thin piece of metal bent to the form a cylinder, with the meeting edges thereof overlapping. A slight covering of paper or other material" is necessary "to bind the metal on the wad or contents of the cartridge." Thin sheet brass or steel may be used.

[Printed, 10d. Drawing.]

A.D. 1860, December 24.—N° 3156.

NEWTON, WILLIAM EDWARD. — (*A communication from William Henry Stevens and Benjamin Rigal Norton.*)—(*Provisional protection only.*)—"An improved archer's bow and bow gun toy."

The toy bow gun for throwing balls is to be furnished with a bow, and is "constructed with a breech-loading barrel." The wire or string of the bow, when drawn back ready to discharge the ball, is retained in position by a hooked lever, and is discharged by a trigger.

[Printed, 4d. No Drawings.]

A.D. 1860, December 26.—N° 3163.

DESBOROUGH, SPENDLOVE, and MIDDLETON, SAMUEL. — "Improvements in the manufacture of boots and shoes, and in the means and apparatus employed for uniting and preparing surfaces of leather and similar materials for this and other purposes."

The improvements relate to modes of joining or uniting the edges or surfaces of leather. They are applied to, among other purposes, the manufacture of scabbards, sword cases, and other articles. In the edges of the leather are formed dove-tailed projections and recesses; the former are filled into the latter, and fastened with wire or other suitable flexible material.

[Printed, 1s. 2d. Drawings.]

A.D. 1860, December 28.—N° 3183.

NEWTON, ALFRED VINCENT.—(*A communication from Mahlon J. Gallagher.*)—"An improvement in breech-loading fire-arms."

The barrel is hinged and is made "to slide and tip" to allow of the piece being charged. The charge chamber is so made that "half of the cartridge chamber is in the breech and half in the barrel." By this means the sticking of the cartridge case is prevented. The barrel is moved by "a crank lever jointed to the breech piece or lock frame, and carrying a stud, to which a connecting arm hinged to the barrel is attached."

[Printed, 8d. Drawing.]

1861.

A.D. 1861, January 10.—N° 61.

HALLIDAY, MICHAEL FREDERICK.—(*Provisional protection only.*)—"An improved trigger for gun locks."

The trigger of fire-arms, especially rifles, is to be so made that its movement takes place "transversely to the barrel, instead of parallel with it." The possibility of "deviation of the muzzle from the aim taken" is intended to be obviated, and greater safety from accidents insured.

[Printed, 4d. No Drawings.]

A.D. 1861, January 12.—N° 98.

FRANCI, GIOVANNI. — (*Provisional protection only.*)—"Improvements in cannon and mortars, and in projectiles for the same."

The piece is to be so constructed that the part containing the charge chamber may be used as a mortar, and the barrel may be elongated when required to enable the piece to be used as a cannon. The barrel part is to be connected with the charge chamber by "a double-hinged piece or other mechanical equivalents." The powder chamber is to be made smaller than the

bore, and the projectile is to be stepped in its rear part, so that its extreme end may enter the powder chamber.

[Printed, 4d. No Drawings.]

A.D. 1861, January 15.—N° 108.

HEMMING, SAMUEL. — (*Provisional protection only.*)—"Improved rifle ranges and butts, and appliances connected therewith."

It is proposed to construct a series of butts, so arranged that many persons may fire at "many targets at various distances at the same time." The principal butt is to be erected at the further extremity of the range, and one or more intermediate butts are erected. The butts and the firing stations are erected upon level ground or upon stages arranged at different elevations, so that the firing may go on simultaneously from the extremity of the ground, or from under the shutter of the intermediate butt or butts. Shot-proof communications are provided to enable persons practising to pass to and from the butts. Electric targets are to be used, and traversing shot-proof shields are employed to enable the marker to go up to the target in safety.

[Printed, 4d. No Drawings.]

A.D. 1861, January 15.—N° 109.

SIDEBOTTOM, JOHN.—"Improvements in fire-arms and ordnance."

The barrel of the gun is supported in two bearings, or in "a swivel bush," and a curved groove or scroll is made in the barrel, into which a fixed stud or projection is made to enter. When the piece is fired and recoils the action of the stud in the curved groove gives rotation to the gun, and so imparts rotation to the projectile as it issues from the bore.

[Printed, 8d. Drawing.]

A.D. 1861, January 15.—N° 115.

DAVIES, GEORGE.—(*A communication from André Nadal.*)—"Improvements in the manufacture of blades for knives, razors, swords, bayonets, and other

"similar articles, and in apparatus to be used in such manufacture."

Blades for knives or swords or bayonets are to be made by a rolling operation. Two cylinders or rolls are used, the one having projecting parts or zones corresponding exactly to recesses or grooves formed in the other. "On each of the zones or grooves" (half on one and half on the other roll) are impressed or "recessed the forms of the different blades or other articles to be produced, in such a manner as that they shall strictly correspond." These matrices are to be so arranged "that the thick and thin parts of the blades occur alternately."

[Printed, 4d. No Drawings.]

A.D. 1861, January 15.—N° 120.

PICKEN, JAMES.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms and ordnance."

The breech of the gun is to be closed by means of a solid plug, which is made to slide in a chamber or box in the rear of the barrel. The plug is recessed upon its upper side, and the lid of the box has a projection which, when it is shut down, takes into the recess of the plug and fixes it in its place.

[Printed, 4d. Drawing.]

A.D. 1861, January 19.—N° 147.

LYTTLE, WILLIAM A.—(*Provisional protection only*).—"Improvements in and connected with projectiles to be used with ordnance, rifles, and other fire-arms."

Cartridges are to be made of paper, and when rammed down are broken by means of a projecting pin fixed in the barrel in front of the charge chamber. Projectiles are to be made with conical fronts, cylindrical middle parts, and tapering rears, wings, or vanes being attached to the rear part to give rotation. A stem projecting from the rear is inserted in a perforated disc or wad. The projectile may be made of iron or pottery or glass. Hinged wings may be attached to the projectile, which fly open as it is propelled through the air.

[Printed, 4d. No Drawings.]

A.D. 1861, January 21.—N° 161.

SCOTT, JOHN.—(*Provisional protection only.*)—"Improvements in rifles and their projectiles."

The barrel is to be rifled with "grooves of the form in section of the segment of a circle," with a twist from left to right, and of an increasing pitch. The turn may be "a quarter turn in the first 12 inches from the breech, and a quarter turn in the last six inches at the muzzle." The projectile has projections made upon it to fit the rifle grooves.

[Printed, 4d. No Drawings.]

A.D. 1861, January 26.—N° 216.

BESSEMER, HENRY. — "Improvements in ordnance and projectiles."

A breech-loading cannon is made in two parts, the barrel part, which is supported by trunnions in the usual way, and the breech part, which is a massive block attached by strong side bars or straps to the trunnions. The breech block is supported by a screw attached to the gun carriage or frame. When the gun is to be charged, the breech end of the barrel is elevated above the breech block, which remains fixed, and when the cartridge is inserted the breech is depressed and fixed to the breech block. For lighter guns a moveable breech block may be used.

Projectiles are made with a stem or tail entering into a recess in the breech. The stem or tail may be held by a screw or cotter, until the pressure of the gases breaks it and releases the projectile.

Projectiles are made of molten steel or malleable iron, cast in moulds, and then stamped in dies or rolled. Hoops for hooping guns are made by punching out from a suitable plate annular pieces, which are then hammered or rolled.

[Printed, 1s. Drawings.]

A.D. 1861, January 31.—N° 256.

REEVES, CHARLES.—"A new or improved instrument or apparatus for converting breech-loading small arms into muzzle-loading small arms, and an improvement or improvements in cartridges for breech-loading small arms."

When it is proposed to use a breech-loader as a muzzle-loader, a cup is introduced into the barrel, and fitted into the charge chamber. The cup has a soft metal or leather seat.

Cartridges are made of stiff paper in every part, except at that part which lies opposite the end of the nipple channel. At that part of the cartridges perforations or slits are made, which are covered with thin paper.

[Printed, 8d. Drawing.]

A.D. 1861, February 5.—N° 296.

JEFFERY, RICHARD.—(*Provisional protection only.*)—"An improved tumbler lever and body applicable to double and single breech-loading guns."

The barrels are to be secured to the stock by "a lever made in two parts." The part "which grips the barrels is at one end of a semicircular form with a flat end;" the flat end rests "on the flat underneath the barrels, and its convex side lies embedded in the stock," so that the flat surface "lies against the barrels and grips them."

[Printed, 4d. No Drawings.]

A.D. 1861, February 5.—N° 302.

PURDEY, JAMES.—"Improved apparatus for ramming and turning over breech-loading cartridges."

The cartridge case is made in the usual way with ignition primer attached to it. It is then placed in a cylinder and rammed down by a self-acting plunger, and when filled it is taken out and its position is reversed. Pressure is again applied to the plunger, at the same time that the cartridge is made to turn rapidly by means of a revolving spindle, and a stud being made to bear on the edge of the cartridge, turns it inwards upon the wad.

[Printed, 10d. Drawing.]

A.D. 1861, February 6.—N° 308.

FORBES, CHARLES WENTWORTH.—"An improvement in rests for rifles and other small arms."

A rest for a rifle is formed by connecting one end of the ramrod with the stock, and allowing the other end to rest in a socket attached to a band fastened round the knee.

The ramrod may be attached to the stock by a fixed or moveable loop or fastening, so that by adjusting the point of fastening the rifle may be elevated or depressed.

[Printed, 6d. Drawing.]

A.D. 1861, February 8.—N° 321.

STORM, WILLIAM MONTGOMERY.—"Improvements in the construction of ordnance, and of projectiles to be used in ordnance."

A loose tubular lining piece or "gas check or valve" (such as is described in the Specification of prior Letters Patent dated November 29, 1860, numbered 2933, is applied to breech-loading cannon. The breech piece is hinged to the breech end of the cannon, and is fastened in its place by a screw working in the rear. "A loose tubular bung, which fits into the barrel of the weapon, and covers the junction between the barrel proper and the breech piece," is used as a gas check valve to make a tight joint.

Annular grooves are formed in elongated projectiles, to which is attached soft packing, which may be expanded by the discharge.

[Printed, 10d. Drawings.]

A.D. 1861, February 9.—N° 334.

JENNINGS, JOSIAH GEORGE.—"Improvements in capsules or covers for the necks or ends of jars, bottles, and other vessels, and hollow tubes or bodies."

Capsules or covers suitable for, among other purposes, covering the muzzles of cannons, mortars, rifles, and other fire-arms, are made by attaching a piece of a tube of vulcanised india-rubber to a metallic or other base or cover. The india-rubber is so attached that it will readily turn back, and so allow the cover to be fixed on the muzzle of the gun.

The metallic base is made by pressing discs of sheet metal in a suitable fly press; the vulcanised rubber is then attached to the raised edge of the metal.

[Printed, 8d. Drawing.]

The invention consists of:—

1st. "Four staves, with or without plummets."

2nd. "A scale marked as may be required," and "fixtures for the same."

3rd. "A tape or tapes to form a square or oblong, with diagonal tapes to prove square."

To measure the distance of an object from a given point. "Two of the staves are to be placed in the ground, so as to stand perpendicular and in a straight line from the object, distant from each other as many feet or yards as one side of the square, which is afterwards to be formed, measures; the tapes are then to be stretched out so as to form a square, one side of which is determined by the position of the two staves already in place, and the other two staves are placed at the other two corners indicated by the tapes, so that there is a staff at each corner of the square, and one side of square is in a right line with the object; the scale or index is then fixed to the staff which is the farthest from the object of the last two placed. The observer places himself a short distance from the staff with the scale attached, so as to have the two last placed staves between him and the object, and it will be found that a straight line passed through the staves will pass on one side of the object; he must then carry his eye so as to bring the staff furthest from him and the object in a straight line, and mark where it intersects on the scale, which will indicate the distance of object as required.

"The plumb lines to be used for the purpose of sighting the object, if necessary."

[Printed, 4d. No Drawings.]

A.D. 1861, February 19.—N° 407.

PARIS, MATTHEW.—(*Provisional protection only*).—"Improvements in fire-arms."

In the place of an ordinary trigger a stud is to be used, which presses "directly upon the arm of the sear;" or "the sear itself may be prolonged and directed downwards so as to project from the stock for the finger to press."

[Printed, 4d. No Drawings.]

A.D. 1861, February 19.—N^o 412.

NEWTON, WILLIAM EDWARD.—(*A communication from William McCord, Charles Foster Cox, and Robert Woodward.*)—(*Provisional protection only.*)—"Improvements in the construction of guns, and in loading and firing the same."

Two or more barrels are to be fixed in a casing so constructed that water may circulate round the barrels and keep them cool. The barrels are fitted to a stationary block or breech piece, in which works a reciprocating breech piece moved by cams and containing charge chambers. The cartridges are to be fed into the charge chambers from hoppers, and discharged as fast as they are fed.

[Printed, 4d. No Drawings.]

A.D. 1861, February 21.—N^o 436.

WATSON, WILLIAM, and WATSON, ALEXANDER.—(*Provisional protection only.*)—"Improvements in machinery or apparatus for casting bullets."

Moulds which work in pairs are to be employed, in which the bullets are cast alternately. A moveable ram actuated by a lever is used for forming the recess in the bullet, it also pushes the bullet out of the mould and "cuts off the gate."

[Printed, 4d. No Drawings.]

A.D. 1861, February 22.—N^o 441.

COLE, ARTHUR LOWRY.—(*Provisional protection only.*)—"Improvements in fire-arms."

In "order to obtain a truer sight in regard to the range of fire-arms of any calibre," it is proposed "to make the twist of the barrels of fire-arms progressive," starting from nothing "and twisting progressively, which operation may be termed a gaining twist."

[Printed, 4d. No Drawings.]

A.D. 1861, February 22.—N^o 450.

WALKER, WILLIAM.—(*A communication from Thomas Welcome Roys.*)—"Improvements in rocket guns and rocket harpoons, and appendages to be used therewith."

A harpoon is attached to a rocket which is fired from a portable tube, and employed in whale fishing. A hook is connected with the rocket and a cord is attached thereto. The tube from which the rocket is discharged is held by the marksman, and, to protect him from the back fire of the rocket, a leather screen is fitted on the tube in front of the discharging lock.

[Printed, 6d. Drawing.]

A.D. 1861, February 28.—N° 517.

NEWTON, THOMAS.—(*Provisional protection only.*)—"Improvements in the accoutrements of horse soldiers' and other saddles."

Holsters are to be attached to the saddle by means of plugs fitting in sockets attached to the stirrup bars, which are placed forward. The valise is also to be attached to the saddle by means of plugs and sockets.

[Printed, 4d. No Drawings.]

A.D. 1861, March 4.—N° 552.

NEWTON, WILLIAM EDWARD.—(*A communication from Richard Gornall and William John Hooper.*)—"Improvements in machinery for making bullets."

Self-acting machinery is employed for dividing a bar of lead into blanks, and forming them into bullets. "A cylindrical, undivided, or solid matrix" is used, being "adapted to first compress the bullet approximately into form, and then to hold it to be turned or finished." The bar of lead is fed into the matrix, and a suitable length is cut off, and is forced into the matrix by a punch, and is formed into a bullet approximately of the required shape. The bullet is then pushed out of the matrix, is seized by a holder, and finished by being turned by a reciprocating cutter.

[Printed, 10d. Drawing.]

A.D. 1861, March 5.—N° 562.

HANSON, CHARLES.—"An improved method of igniting or firing gunpowder, gun cotton, and other like explosive compounds in large and small fire-arms and ordnance, applicable also to the firing of explosive compounds generally."

Charges of gunpowder or other exploding material are fired in guns by means of compressed air. An air-tight piston is made to work in a cylinder, which communicates by means of a small aperture with the charge in the charge chamber. By rapidly forcing the piston into the cylinder the air is greatly compressed, and rushing through the small aperture causes the charge to be ignited.

[Printed, 4d. No Drawings.]

A.D. 1861, March 6.—N° 568.

ARBUCKLE, GEORGE BENJAMIN VAUGHAN, and SCOTT, THOMAS.—“An improvement in the locks of fire-arms.”

The sear is lengthened, and, instead of its being acted upon by a trigger in the ordinary way, a button or stud is attached to it. By pressing upon the button the nose of the sear is released from the bent of the tumbler, and the hammer is allowed to fall.

[Printed, 6d. Drawing.]

A.D. 1861, March 8.—N° 585.

BRITTEN, BASHLEY.—“Improvements in projectiles for rifled ordnance.”

In casting explosive shells, the core is made “of numerous metal pieces put together round an inner core of loam or sand.” Round this the external shell is cast; the loam is then removed from the inside, leaving a cavity for the bursting charge. A coat or belt of lead is attached to the projectile by first coating its surface with zinc, solder, or tin. When the projectile is intended to contain molten iron it is lined with clay or loam.

[Printed, 8d. Drawing.]

A.D. 1861, March 8.—N° 589.

DOURY, PAUL.—(*Provisional protection only.*)—“Improvements in rifled or smooth barrelled arms, discharging projectiles, forcibly propelled or not, and loaded by the breech.”

The moveable breech of the cannon is to be attached to a lever, by which it is to be lifted “between two parallel grooves.” The projectile is to be made in two parts, the fore part when heated

red hot is jointed to the rear part, which has studs formed upon it fitting into the rifle grooves.

[Printed, 4d. No Drawings.]

A.D. 1861, March 12.—N° 611.

PERRY, WILLIAM.—“Certain improvements in the manufacture of gun barrels.”

Gun barrels are formed by twisting a strip of iron helically round a mandril. The edges of the strip are made “to overlap” and fit one into the other, so that the process of rolling tends “to press the joints together, rather than to open them.” The twisted strip is heated to a welded heat, and welded by rolling.

[Printed, 8d. Drawing.]

A.D. 1861, March 13.—N° 613.

SPENCER, GEORGE.—(*Provisional protection only.*)—“Improvements in india-rubber springs for railway and other uses.”

Supporting plates made of thin iron or other metal, or of wire gauze, are to be inserted or imbedded at intervals through the mass of the india-rubber spring, the metal not being allowed to project. The springs so made are suitable for being used for gun carriages and other naval and military uses, and for other purposes.

[Printed, 4d. No Drawings.]

A.D. 1861, March 15.—N° 646.

MARSON, JOHN.—“Improvements in breech-loading fire-arms, and their projectiles.”

The breech is closed by a plug, which slides in a box at the rear of the breech end of the barrel. The plug is attached by a connecting piece to a lever, which also forms the lid of the box.

The projectile has passages made in it, which have a spiral direction, so that the action of the air upon their inclined sides may give rotation to the projectile as it is propelled through the air.

[Printed, 6d. Drawing.]

A.D. 1861, March 15.—N° 651.

BURNETT, CHARLES JOHN.—“Improvements in the structure
“and construction of ordnance and other fire-arms, and of pro-
“jectiles to be used with them.”

Ordnance is constructed of tubular parts, which are connected together by screw threads. The tubular parts are made of a taper shape, and the screw formed on the outside of one tube is screwed into a corresponding screw formed inside the next tube, in such a manner that the metal of the outer tube is in a state of tension, and that of the inner tube is in a state of compression.

Projectiles are made of hollow pieces, which are connected together by wires or chains placed inside them, space being left for a bursting charge. When the charge is exploded the parts may be held together by the chains, and act as chain-shot.

[Printed, 6d. No Drawings.]

A.D. 1861, March 16.—N° 662.

KRUPP, ALFRED.—(*Provisional protection only*).—“Improvements in the construction of mortars, and in the means of
“attaching the same to the carriages used therewith.”

Mortars are to be made of cast steel hammered into the required shape, and afterwards bored. The bottom of the mortar is made of a convex circular shape, and a V groove is cut in it “at right angles to the vertical axis of the mortar.” The bed is made of brass or copper, and a V groove is cut in it at right angles to the groove in the mortar, and to connect the mortar to the bed a cross piece is used, which fits into the said two V grooves.

[Printed, 4d. No Drawings.]

A.D. 1861, March 16.—N° 671.

SCOTT, EBENEZER ERSKINE.—“Improvements in breech-
“loading fire-arms.”

The breech is closed by a charge chamber, which has a reciprocating motion, being moved by a lever arm acting on the top of the stock. In front of the charge chamber are inclined lugs, which take into recesses formed in the breech end of the barrel. A recess is formed in the rear end of the barrel, into which the conical front of the breech chamber is forced, so as to make a gas-tight joint.

[Printed, 10d. Drawing.]

A.D. 1861, March 25—N° 743.

ARMSTRONG, Sir WILLIAM GEORGE.—(*Provisional protection only*).—"Improved breech-loading cannon."

The breech is proposed to be closed by a wedge, sliding in grooves in an opening made transversely to the axis of the piece. The wedge is moved "by a handle connected with bars sliding within limits in grooves in the wedge, so that the handle "and bars together may be used not only for drawing up and "pushing back the wedge, but also as a hammer for tightening "and slackening the wedge. The breech is closed by a plug or "stopper, which is analagous to the vent piece in the Armstrong "gun, and which slides horizontally in front of the wedge." The plug has a projection in front, which enters the bore, and an expanding cup is attached to it to prevent escape of gas; it is pressed into the bore before, and withdrawn, after discharge by a lever attached to the stopper. The vent hole is made in the body of the gun, and the vent is stopped by a safety slide until the wedge is pushed home.

[Printed, 4d. No Drawings.]

A.D. 1861, March 25.—N° 752.

BENTLEY, THOMAS.—(*Provisional protection only*).—"Improvements in making up or packing charges or small quantities "of gunpowder, drugs, or other articles."

An outer case of paper, thin metal, or other suitable material, is to be first prepared, of the size and shape suitable for containing the required number of gunpowder charges. As each charge is deposited it is covered with a thin cover of paper to secure it in its position, and separate the series of charges from one another. Each cover may be furnished with a string to withdraw it from the case.

[Printed, 4d. No Drawings.]

A.D. 1861, March 28.—N° 773.

PARSONS, PERCEVAL MOSES.—"Certain improvements in "fire-arms, and in the method of rifling the barrels of the "same."

The improvements are based upon those described in the Specification of prior Letters Patent dated March 20, 1860, N° 720. The breech of the barrel is closed by a plug working in a chamber in the rear of the barrel. The front end of the plug terminates "in a knob of a spherical form."

Another mode of employing "a spherical plug consists in constructing it in the form of a complete, or nearly complete, sphere, with an aperture through it corresponding to the bore of the piece." A pin connected with the spherical plug "passes through an aperture in the side of the chamber, and is attached to an arm or lever, by which the plug is turned in its seat, and the aperture opened or closed." To make a gas-tight joint a ring of malleable or ductile metal is used. Grooves are formed in rifle barrels by using "cutting and polishing tools in the form of circular or elliptic spindles," which are arranged and placed "in the rifling mandril in a position oblique to the central axis of the barrel."

[Printed, 1s. 2d. Drawings.]

A.D. 1861, April 5.—N° 843.

NEWTON, WILLIAM EDWARD.—(*A communication from Christopher Miner Spencer.*)—"Improvements in breech-loading fire-arms."

Cartridges are inserted into the breech end of the barrel, by pushing them forward from a tubular magazine, formed in the stock, or they may be fed by hand. The cartridges contain their own ignition priming, and are discharged by a striker, which receives a blow from the hammer. An annular projection is formed on the base of the cartridge, which prevents the cartridge from entering too far into the barrel. The breech is closed by a block moved by a lever turning on an axis, and forming the trigger guard. Projecting teeth are formed on the lever, which, when the trigger guard is pushed down, take hold of and withdraw the case of the exploded cartridge. When the trigger guard is put back in its place the breech is closed, and the piece is ready to be discharged.

[Printed, 8d. Drawing.]

A.D. 1861, April 6.—N° 853. (**)

GHISLIN, THOMAS GOULSTON.—(*Letters Patent void for want of Final Specification.*)—"Preparing, applying, and adapting

"certain vegetable productions called eiklonia buccinalis, pro-teaceæ, juncus serratus, juncus trista, and armyllideæ to further new purposes of manufacture, and certain modes to effect the same."

This invention "relates to manipulating and manufacturing by chemical and other processes certain vegetable productions found in and indigenous to South Africa and elsewhere.

"The first article, a marine plant or fungi, known to botanists as the eiklonia buccinalis" embraces "several varieties, both solid and hollow." Amongst other purposes it is applied to manufacturing, coating, or ornamenting "razor and knife handles," sword, dagger, "stiletto handles, mountings for guns and pistol stocks, bayonet, sword, and other sheaths;" also "shot, powder, and other flasks."

[Printed, 4d. No Drawings.]

A.D. 1861, April 9.—N° 869.

GILL, CHARLES. — (*Provisional protection only.*) — "Improvements in the construction of swivels, hooks, or other similar connecting instruments, for chains jewellery, and other articles."

Swivels suitable for, among other purposes, being used to attach "sword sheaths or other military accoutrements" are made by forming a ring or loop and closing it by a jointed piece working on a pin joint and fastened by a bolt. The attaching ring is formed with a cap or socket which is fastened to a loose ring fitted on the stem of the swivel, and held upon it by a fixed head formed on the stem.

[Printed, 4d. No Drawings.]

A.D. 1861, April 9.—No. 874.

WOOD, WILLIAM. — "Improvements in breech-loading fire-arms and ordnance."

The breech end of the barrel is formed of a tubular piece, which is "removable upon a rack or screw to a sufficient extent to expose a chamber for the reception of the charge; this in the case of small arms or small ordnance would be effected by hand, but for large guns by means of a lever or other mechanical appliance."

The tubular piece is fastened by turning it and locking it in position by a joint similar to a bayonet joint.

[Printed, 1s. Drawings.]

A.D. 1861, April 13.—N° 907.

BAILEY, THOMAS. — "Improvements in breech-loading fire-arms."

The breech is closed by a plunger jointed "at the front part, and slotted at the hinder part for the purpose of receiving a lever, which answers for the bolt or key to secure the plunger in its proper position when the breech is closed."

On the front of the plunger are fastened a cap of thin copper and elastic washers, in front of which is a steel washer, so as to make an elastic seat and a tight joint.

[Printed, 6d. Drawing.]

A.D. 1861, April 13.—N° 908.

COOPER, JOSEPH ROCK. — "An improvement in, or addition to, certain kinds of breech-loading fire-arms and ordnance."

In the case of breech-loading arms, where the breech is closed by a sliding plug, a washer of vulcanised india-rubber is attached to the front of the plug; upon the washer is a brass or iron disc through which passes a pin, so that the disc and washer have a slight play upon the plain part of the pin. The washer and disc form a gas-tight joint.

[Printed, 8d. Drawing.]

A.D. 1861, April 13.—N° 913.

CORKE, EDGAR. — (*Provisional protection only.*) — "An improved instrument to be fixed on the bayonet or muzzle of a rifle for estimating distances."

A guaged aperture is to be fixed to the muzzle or bayonet of a rifle; it is marked on one side for six-feet heights, corresponding to infantry, on the other to eight-feet heights, corresponding to cavalry. A slide is attached to the aperture, which is adjustable to the angle vertically subtended by the object aimed at, and so enables the distance to be guessed.

[Printed, 4d. No Drawings.]

A.D. 1861, April 13.—N° 916.

ELEY, WILLIAM THOMAS.—“Improvements in the manufacture
“ of cartridge cases for breech-loading fire-arms.”

Pin cartridges are employed, the pin acting transversely to the axis of the gun. The priming is placed in a flattened cap fixed in the paper seat of the cartridge. The pin, when struck is forced upon the outside flat face of the cap, and explodes it. In some cases the cap is placed transversely to the axis of the piece, and the pin striker enters it in the usual way; but the pin has a shoulder upon it, larger than the hole, through which the stem of the pin passes. The shoulder prevents the pin from being blown out when the cap is exploded.

[Printed, 6d. Drawing.]

A.D. 1861, April 15.—N° 921.

BROOKS, EDGAR.—“New or improved machinery for grinding
“ and polishing swords, matchetts, and knives, which said
“ machinery may also be employed for grinding gun barrels and
“ files,” “and for other like purposes.”

Discs of metal having projecting radial divisions formed on their faces are mounted on spindles. The compartments between the discs are filled with polishing composition. The discs are used for grinding swords or gun barrels.

[Printed, 8d. Drawing.]

A.D. 1861, April 15.—N° 923.

SAX, ALPHONSE.—“Improvements in ordnance and projectiles.”

Several cannon are mounted on a frame. The cannon are connected together by a common graduated sighting apparatus, so that their muzzles may be directed to the same object, and when they are fired simultaneously the fire may be concentrated on one point. Hollow projectiles are made with a strong cylindrical case, inside which are a series of tubes which may be charged and exploded, and so scatter bullets in various directions.

[Printed, 1s, 4d. Drawings.]

A.D. 1861, April 16.—N° 930.

EDEN, FREDERICK MORTON.—(*Provisional protection only.*)—

“An improved cartridge for breech-loading guns.”

The cartridge case is to be made of thin metal, by preference of aluminium, and is divided longitudinally to allow of expansion in the barrel.

The cartridge is discharged by a pin or striker, which has its end enlarged and hollowed out. In the hollow is placed the priming, and it is ignited by forcing the pin striker down upon another pin fixed in the seat of the cartridge.

[Printed, 4d. No Drawings.]

A.D. 1861, April 18.—N° 950.

JONES, HENRY.—“Improvements in certain kinds of breech-loading fire-arms.”

The barrels turn down or are “tilted” to receive the charge. The “tumbler or griper, by which the barrels are locked and “unlocked,” is made “in one piece with its axis;” it is “put in its place from the inside of the body.” The upper end of the axis “may be supported with a centre plate screwed to the body,” or be left unsupported. On the “lower end of the axis,” which is moved by a lever, is a “lifter, fixed in its place by a screw washer.” The lifter “consists of a small projecting inclined arm, which, when the arm or lever is made to unlock the barrels, strikes against the incline on the back part of the “lump of the barrels,” and the breech ends of the barrels are raised “so far that they can be readily moved by the hand.”

[Printed, 8d. Drawing.]

A.D. 1861, April 19.—N° 971.

SCHENKL, JOHN P.—“A new and useful packing for projectiles for guns or ordnance, especially those which are rifled or grooved on their bores.”

Packings of paper pulp or papier maché are attached to projectiles, and are expanded into the rifle grooves by the explosion of the powder charge. The paper pulp is moulded into the required shape and dried. Coatings of varnish or oily matters

may be applied to the packing to protect it from the atmosphere and also serve as lubricants.

[Printed, 6d. Drawing.]

A.D. 1861, April 22.—N° 990.

LEETCH, JAMES.—(*Provisional protection only.*)—"Improvements in the manufacture of breech-loading fire-arms, and a new method of attaching the barrel or barrels of a gun to the stock."

The breech end of the barrel is to be closed by "a hinged breech piece," which is attached to an iron plate filled into the stock. The hinged breech piece "is turned away from the back end of the barrels" to admit the charge, and is then "shut down, so as to form a solid and secure back to the end of the barrel."

[Printed, 4d. No Drawings.]

A.D. 1861, April 22.—N° 992.

HAWKER, THOMAS PARRY.—(*Provisional protection only.*)—"Improvements in the manufacture of cartridges."

The part of the cartridge that contains the powder is to be made of gutta percha lined with paper. The part of the cartridge that contains the ball is to be made of such a diameter that after the projectile is inserted the "powder receptacle" may be introduced into it.

[Printed, 4d. No Drawings.]

A.D. 1861, April 22.—N° 1000.

HENRY, ALEXANDER.—"Improvements in fire-arms, and in apparatus to be used therewith."

An adjustable cheek piece is attached to the stocks of rifles to give steadiness to the marksman's aim.

The back sight consists of a hinged rectangular frame having a cross piece, which is moved up and down by a vertical screw. The vertically sliding cross piece is graduated in front, and upon this scale there is fitted a vernier, to which a horizontal traverse is given by means of a screw terminating in a laterally projecting milled head." The face of the frame "may be

" graduated to show the requisite elevation for different distances. " The front sight has a lateral adjustment," being made to slide in a bed by means of a traversing screw, whose end is squared, so that it may be turned by a key. A moveable steel cutter is attached to the bullet mould for trimming the bullet.

[Printed, 8d. Drawing.]

A.D. 1861, April 23.—N° 1011.

WARRY, ROBERT.—(*Provisional protection only.*)—" Improve-
ments in the construction of breech-loading ordnance, and in
" the carriages and projectiles used for the same."

A transverse opening is to be made in the breech of the gun, in which a breech piece is inserted. A hollow screw works in the rear of the gun, behind the breech piece. The gun is to be mounted in bushes to which a horizontal traversing motion is given. A spiral thread is to be cut on the rear part of the projectile, and cord is wound round it and fastened so as to form a packing.

[Printed, 4d. No Drawings.]

A.D. 1861, April 24.—N° 1023. (* *)

GISBORNE, FREDERIC NEWTON. — (*Provisional protection only.*)—" Improvements in the construction of electric targets for
" rifle and gun practice."

The front face of the metal target is studded with slightly projecting metal plates, which are electrically connected, either directly or indirectly, with one or more metal styles that mark the chemically prepared paper of a registering apparatus near the marksman. According to one plan, when the shot strikes the target, it causes one of the metal plates to protrude a bolt at the back of the target; a wheel behind the target revolves synchronously with a metal style at the firing stand; the said wheel has a projecting point which describes circles of decreasing diameters, and which therefore successively releases and makes electrical contact with the protruded bolts, at the same time causing the metal style of the registering apparatus to mark the paper at places corresponding to the parts of the metal target struck. In

another plan, there is a distinct wire to each bolt, both in the metal target and in the paper target of the registering apparatus, and whichever bolt is struck by the shot is at that instant simultaneously protruded on the metal target, and on its miniature prototype in the registering apparatus.

Other means of protruding points at the back of the target, to be released or to make instantaneous electric contact, are set forth. Modifications of the two methods described above are also alluded to. Instead of the marks on the paper registering target being made by electro-decomposition, they may be either printed or punctured.

[Printed, 4d. No Drawings.]

A.D. 1861, April 26.—N° 1050.

BROWN, JOHN HARCOURT.—"Improvements in apparatus for lubricating the barrels of fire-arms and ordnance."

The head of the ramrod is made hollow, and contains oil or other lubricant. By means of suitable valves the action of the ramrod during the act of ramming down is made to express a regulated quantity of oil, which is made to lubricate the head or sponge of the rammer or the interior of the barrel.

[Printed, 10d. Drawing.]

A.D. 1861, April 27.—N° 1069.

BESSEMER, HENRY.—"Improvements in projectiles and ordnance."

"Sunken channels" are formed "on the exterior surface of the projectile."

They are made in a line with the long axis of the projectile and terminate in a sudden bend or elbow, having a direction at right angles, or nearly so, to their former course." For piercing inclined armour plates a punch or gauge is formed on the head of the projectile. A cast-iron gun is strengthened by boring it out and inserting in it a hammered metal tube of copper or gun metal, or wrought iron or steel. Bronze guns may also be lined with an interior tube.

[Printed, 8d. Drawing.]

A.D. 1861, May 1.—N^o 1082.

HOLLIS, ISAAC.—“An improvement or improvements in the manufacture of the guards and trigger plates of rifles and other small arms.”

The trigger guard and plate are made in one piece by casting or forging and stamping them of the required shape. An opening or passage is made in the trigger plate immediately above the guard, through which the trigger works.

[Printed, 62. Drawing.]

A.D. 1861, May 1.—N^o 1088. (* *)

BROWNING, WILLIAM.—(*Provisional protection only.*)—“A new method & apparatus for ascertaining the distance of distant objects,” specially applicable for the purposes of gunnery.

“My invention, which relates to means of determining the distance of distant objects without actual measurement, or any approach towards the object, consists of a quadrant, marked to indicate miles and yards, and other distances used in combination with a given base line.”

A wire or chain is used to determine the length of the base line which is adapted to the quadrant. The base line is measured “as near as may be at right angles to the direction of the object.” If the base line be exactly at right angles to the direction of the object, the distance shown by the quadrant will be the same at whichever end of the base line it is applied. “Supposing the base line not to be at right angles to the direction of the object, then the quadrant will indicate a greater distance at one end of the base line than at the other, the mean of which may be taken as the true distance, or the position of the base line may be altered until the angles and distances indicated are alike.”

“Instead of ascertaining the distance by equal angles & measures determined to each end of the base line, the one angle at the end of the base line may be at right angle in all cases, and the distance read off from the quadrant at the other end of the base line.” A “cross sight,” with a telescope, is used to set off the right angle, and the quadrant is placed at the other extremity of the base line, with its “zero radius,” “in line with the cross sight of the telescope;” the object is then sighted. The sights

" of the measuring limb of the quadrant," and the distance of the object, can be at once read off from the graduations on the circumference of the quadrant.

[Printed 4d. No Drawings.]

A.D. 1861, May 1.—N^o 1091.

MCNEILE, ALEXANDER.—"Improvements in the construction of targets."

The target "consists of a" strong framing divided into any "convenient number of compartments," covered with sheets or plates of iron. Connected with each plate is a lever which, when the plate is struck, sets in motion lifting apparatus, worked by detents and weights, and connected with a signal or coloured vane or disc. Any suitable mechanical means may be employed for causing the plate when struck by a bullet to set in motion apparatus which will display a signal corresponding to the plate struck.

[Printed, 10d. Drawing.]

A.D. 1861, May 10.—N^o 1189.

BARRETT, STEPHEN.—(*Provisional protection only.*)—"Improvements in projectiles."

Projectiles are to be made of cast steel of a form tapering from front to rear. A series of rings or shoulders are formed on the projectile, to which a lead coating is attached. The rear end of the projectile is hollowed to throw the centre of gravity forward.

[Printed, 4d. No Drawings.]

A.D. 1861, May 10.—N^o 1190.

BADDELEY, JOHN FRASER LODINGTON.—"Improvements in bands for rifles and other fire-arms."

Bands for attaching the barrel of a gun to the stock are made thick enough at the lower part to allow a connecting screw to be inserted in the band, without any projecting part being left to inconvenience the hand. The sharp edges of the ordinary lug are thereby avoided.

[Printed, 6d. Drawing.]

A.D. 1861, May 10.—N° 1191.

VALLANCE, PHILIP.—(*Provisional protection only.*)—"Improvements in fire-arms and ordnance."

A charge chamber of smaller diameter than the bore of the gun is to be used. The touch-hole is so placed that the charge is ignited in front, and so the powder is burnt gradually, and gives out a gradually increasing pressure of gas.

[Printed, 4d. No Drawings.]

A.D. 1861, May 11.—N° 1194.

SILLEM, HERMAN JAMES.—(*Provisional protection refused.*)—"An improved explosive shell."

The shell is to be cast on a core, on which are projections and indentations, which will give corresponding figure to the shell, and cause it to break up into the required number of fragments. A lead coating is to be attached to the rear of the projectile, whose surface is tinned to receive the coating.

[Printed, 4d. No Drawings.]

A.D. 1861, May 14.—N° 1229.

WOOLLCOMBE, ROBERT WILLIAM.—"Improvements in projectiles and in fire-arms for discharging the same."

Projectiles are made in the form of "discs, rings, and oblate spheroids in order to obtain cycloidal rotation in contradistinction to helical or rifle rotation." The projectiles are by preference made "eccentric, but with the centre of gravity in the equatorial plane." The bore of the gun is made "straight, that is, without twist, and of a section corresponding with the transverse section of the projectile, leaving just sufficient room for the projectile to roll in the bore."

[Printed 8d. Drawing.]

A.D. 1861, May 16.—N° 1246. (* *)

GISBORNE, FREDERIC NEWTON.—"Improvements in the construction of electric targets for rifle and gun practice."

The apparatus to be used to carry out this invention consists of a target, a pair of synchronous instruments (one at the target the

other at the firing stand), and the recording apparatus. The use of the synchronous instruments enables the electric current from all the plates of the target to be transmitted "through one wire" to the printing and recording instrument at the firing stand," but the said synchronous instruments may be dispensed with by using a compound wire in the main circuit, which compound wire contains "a number of wires not less in number than there are sections or plates in the target."

1st. The target.—The face of the target is composed of a number of plates, perfectly distinct and separate from each other, and suspended from the main framing by separate centre bolts. All the plates "stand in different vertical planes," and the bolts extend back through the framing and project beyond the same. When a plate is struck by a bullet, the electric contact of a local circuit is completed by means of a metallic ball that runs loose in an inclined vulcanite tube containing the polar terminals; the ball usually rests against the extremity of the above-mentioned bolt, but the impact of the shot drives it up the tube, so as to make the requisite contact. Each plate has a local circuit and inclined tube of its own.

2nd. The synchronous instruments.—

The instrument at the target consists of a number of small electro-magnets, each having its vibrating armature, and a revolving and contact making arm. The electro-magnets are at least equal in number to the target plates, and each target plate is connected by means of a shot wire rope with a particular electro-magnet. The ram is made to revolve by means of a large electro-magnet and local circuit provided for that purpose. The circuit completed by the impact of a shot causes one of the armatures to project, and when the revolving arm restores it to its place it completes the main circuit, acts through the synchronous instrument at the firing station, and causes the position of the hit to be marked on paper by the recording instrument.

The instrument at the firing stand consists of an index which revolves by means of clockwork, synchronously with the arm of the instrument at the target, over a number of studs; the number of the studs in this instrument is equal to the number of small electro-magnets in the instrument at the target; and each stud is connected to a corresponding marker in the printing machine.

3rd. The printing or recording apparatus.—A vulcanite plate carries studs or markers connected as described above, and placed

in a relative position to their respective target plates against a sheet of chemically prepared paper. The paper is mounted upon a metallic plate, properly connected with the main circuit, and, according to the stud included in the circuit at any given hit of the target, the mark on the paper is made. The paper is ruled to represent the target as it is divided into plates, and each marksman may take away a record of his own hits on one piece of paper.

[Printed, 2s. 4d. Drawings.]

A.D. 1861, May 20.—N° 1285.

SCOTT, MICHAEL.—(*Provisional protection only*).—"Improvements in ordnance."

A number of pieces of ordnance are to be connected together in a frame, with their axes parallel, and their muzzles fixed at the required distance apart. The pieces of ordnance are to be moved in the directions required by means of hydraulic apparatus consisting of cylinders with plungers.

[Printed, 4d. No Drawings.]

A.D. 1861, May 22.—N° 1303.

NAGLOST, GIOVANNI BATTISTA.—(*Partly a communication from Joseph Zöchling*).—"Improvements in cannon and projectiles to be used therewith."

A breech-loading cannon is enclosed in "an outer casing of suitable metal, the space between being filled with water." The water cools the gun, and enables it to be fired "many times, say thirty in one minute, without heating or fear of bursting." A metallic cartridge is employed, the case being withdrawn from the breech after each discharge.

[Printed, 8d. Drawing.]

A.D. 1861, May 29.—N° 1337.

RENDEL, GEORGE WIGHTWICK.—"Improvements in the manufacture of wrought-iron cylinders for the construction of ordnance."

The cylinders or hoops employed in the construction of built-up guns are brought, after they are forged, to a truly circular form and

of the diameter required by expanding them under pressure while in a heated state. The cylinder is forged "approximately true," "but of a less interior diameter than that required." The heated cylinder is fixed in a bed or frame, and a "taper block" and "loose segment pieces" are forced through the cylinder, and apply a gradually increasing pressure, acting in a radial direction outwards, upon the interior surface of the cylinder. The cylinder is thereby gradually and equally expanded to the dimensions required.

[Printed, *6d.* Drawing.]

A.D. 1861, May 31.—N° 1362.

TOLHAUSEN, FREDERICK.—(*A communication from Michel Javelle.*)—"Improvements in revolving fire-arms."

The barrel is constructed "on an oscillating or swivelling principle;" the cylinder is made to revolve upon a pin from which it may be removed, and so loaded with facility. Spare cylinders may be kept in reserve ready charged. The barrel is attached by a hinged piece to the lock frame, and is turned down to allow of the cylinder being removed.

[Printed, *6d.* Drawing.]

A.D. 1861, May 31.—N° 1363.

HEALEY, EDWARD CHARLES.—(*Partly a communication from Charles Alger.*)—"Improvements in ordnance and fire-arms."

The breech of the gun is closed by a block of a spherical shape, which is bored through with an opening corresponding to the bore of the gun. When the piece is to be charged the spherical block is turned, until its opening coincides with the bore. When the piece is charged the block is turned half round, and closes the breech. A screw plug is inserted in the breech behind the spherical block.

[Printed, *6d.* Drawing.]

A.D. 1861, June 4.—N° 1396.

HAZARD, HENRY HERBERT.—(*Provisional protection only.*)—"Improvements in cartridges."

The cartridge case is to be made of such a size that it will fit in the muzzle of the gun. The powder and bullet are inserted in

the position in which they are to be charged. Upon the end of the cartridge is a rim, so placed that the cartridge may be inserted in the muzzle, and be held by the rim while the charge is pushed through the cartridge case into the barrel.

[Printed, 4d. No Drawings.]

A.D. 1861, June 4.—N° 1400.

FLOYD, WILLIAM REYNOLDS.—“An improved means of or
“apparatus for supporting knapsacks and packs.”

A yoke of leather, or other suitable material, is attached to the knapsack in such a manner as “to fit the upper part of the back
“above or in a line with the shoulders.” The yoke is perforated
“to allow of ventilation,” and is “stitched to the knapsack and
“to the two supporting shoulder straps.”

[Printed, 6d. Drawing.]

A.D. 1861, June 4.—N° 1408.

VAN BRAAM, JOHN ANDREW.—“Improvements in construct-
“ing the barrels of fire-arms and ordnance, and in fire-arms.”

“Longitudinal parallel openings” are made “in the barrels of
“ordnance and other fire-arms, whether spiral or straight, so as
“to permit thorough ventilation of the barrel.” For the pro-
tection of the barrel it is “sometimes enclosed in a tube that
“fits loosely over it.”

A ball-proof screen is used in connexion with breech-loading
guns.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, June 5.—N° 1415.

MANCÉAUX, FRANÇOIS JULES.—“Improvements in breech-
“loading arms, and in projectiles for breech-loading arms.”

The breech of the gun is closed by “fitting at the rear of the
“cannon or barrel a solid disc, which moves upon an eccentric
“pivot, fixed in a lump, cast with or formed upon the rear of the
“cannon or barrel. The periphery of this disc, the posterior surface
“of which is slightly inclined, enters a transverse slot and groove
“made for its reception in the thickness of the metal of which the
“cannon or barrel is composed.”

A lever handle is used to move the disc upon its pivot, and allow the charge to be inserted in the breech. A conical wad fitting in an aperture in a block is used to make a gas-tight breech-piece. Leather packing may be attached to projectiles, which is expanded into the rifle grooves.

[Printed, 10*d*. Drawing.]

A.D. 1861, June 6.—N^o 1417.

BAKER, JOHN.—(*Provisional protection only*).—"The more perfectly finishing off and closing loaded cartridge cases used in breech-loading sporting guns."

The cartridges are to be finished by inserting them in a cylindrical holder fixed on a revolving spindle, while the edges are turned over by a tool. The system may be "applied and worked in any lathe."

[Printed, 4*d*. No Drawings.]

A.D. 1861, June 6.—N^o 1420.

COLES, HENRY THOMAS.—"Improvements in mechanism or apparatus for locks and bolts and other fastenings; gun locks and gun breeches; catches for weaving shuttles, double screws, rifles, pistols, other fire-arms and ordnance, weaving traversers, winders, sewing, weaving, netting, and other machines; and self-acting claws and grapplers."

A grooved circular piece is fitted in the rear of the barrel; "a perforation or cone is made on one side of the periphery of the piece to receive the cartridge."

Sights are placed under the barrels of ordnance "instead of over it."

The barrel of a rifle is made to have a longitudinal motion in a slide in the stock, and is "detached" to allow the cartridge to be inserted in the breech.

[Printed, 1*s*. Drawing.]

A.D. 1861, June 10.—N^o 1486.

HENRY, MICHAEL.—(*A communication from Pierre Joseph Jarre*).—"Improvements in fire-arms."

Movable charge chambers, each containing several charges, are used; they are made to move in a "slotted breech case," and to

have a traversing motion in the rear of the barrel. When the charges of one set of chambers are fired they are removed, and another breech piece, with its chambers ready charged, is inserted in the "slotted breech case."

[Printed, 8d. Drawing.]

A.D. 1861, June 11.—N° 1487.

SCHNEIDER, FRANÇOIS EUGÈNE.—"Improvements in breech-loading fire-arms."

The barrel moves on an axis and is turned down or tilted to receive the charge. It is secured by a bolt working in a recess in the lower part of the barrel, and moved by a lever. The barrels are prevented from being moved too far by a stop made "in the joint itself." The joint of the breech is "affixed to the barrels by a screw or wedge," which enables a tight joint to be made by forcing the barrels close to the breech.

The cartridge case, when the charge has been fired, is extracted by means of a forked piece that takes hold of the cartridge and partially withdraws it.

[Printed, 10d. Drawing.]

A.D. 1861, June 11.—N° 1494.

CHEYNE, CHARLES.—(*Provisional protection only.*)—"An improved method of constructing safety rifle and other gun ranges."

Three sided ball-proof frames are to be employed for the shooters, and they may be placed at various distances from the target.

To protect the shooter from any bullet fired from a frame in his rear, a ball-proof screen is placed at the side of his shooting frame—the screen being out of the line of fire of the rear shooting frame.

[Printed, 4d. No Drawing.]

A.D. 1861, June 11.—N° 1498.

NEWTON, WILLIAM EDWARD.—(*A communication from Charles Richard Alsop, Joseph Wright Alsop, and Henry Chauncey, junior.*)—"Improvements in gun stocks."

The gun stock is made with a pistol handle, and to enable a better grasp to be taken, a hole is made in the stock to receive and

fit the thumb. The stock may be made in parts, and be adjusted to suit the marksman. It may also be used at pleasure as a pistol, or be brought to the shoulder like an ordinary stock.

[Printed, 8d. Drawing.]

A.D. 1861, June 15.—N° 1538.

GRANT, STEPHEN.—“Improvements in breech-loading fire-arms and fowling pieces.”

The barrel turns on an axis and is turned down to receive the charge. A block with a wedge-formed face is fixed on the under side of the barrel, and fits in a socket made in the breech plate, against which it is pressed to form a tight joint. A “detachable piece” is fastened to the wedge-formed face “by screws or otherwise,” and when “worn it may be removed and another substituted” in its place.

[Printed, 10d. Drawing.]

A.D. 1861, June 15.—N° 1541.

PAGE, THOMAS.—“Means & apparatus for facilitating the working and discharge of ordnance placed below the water level.”

Guns intended for firing at objects below the surface of water are mounted in closed chambers, in which air is maintained at a considerable pressure. When the gun is to be fired, a water-tight port is opened at the instant of discharge. The pressure of the air prevents the entrance of water when the gun is fired.

Immediately after the discharge the port is closed.

[Printed, 8d. Drawing.]

A.D. 1861, June 17.—N° 1550.

CLARK, WILLIAM.—(*A communication from Mathieu Castay and Baron Henri de Rivière.*)—(*Provisional protection only.*)—“Improvements in batteries, & in breech-loading ordnance & projectiles.”

A battery formed of iron plates, united by bars and bolts, is to be constructed so that it may “run upon lines of rails.”

Breech-loading guns are to be made with an opening in the breech, in which works a sliding block with a lateral motion. A chain is to be attached to the projectile, and carry wings to give the projectile rotation.

[Printed, 4d. No Drawings.]

A.D. 1861, June 18.—N° 1564.

LIMBERT, JAMES ALFRED.—(*Provisional protection only.*)—"Improvements in mounting & fitting ships' guns & other ordnance."

Ships' guns are to be mounted on "a pivot or cross-bearing, placed above the gun, from which it is suspended."

The gun when fired oscillates with a pendulum motion in its frame. The breech piece of a breech-loading gun is secured in its place by means of a "screw of two, three, or more sections of the same pitch, but of different diameters, so that such screw piece may be disconnected by a lesser number of turns" than would be needed with an ordinary form of single screw breech. Grippers are used to extract metallic cartridge cases from breech-loading guns.

[Printed, 4d. No Drawings.]

A.D. 1861, July 8.—N° 1729.

SNIDER, JACOB, JUNIOR.—(*Provisional protection only.*)—"A method of utilizing old or smooth-bore cannon by strengthening and rifling them, so as to render them efficient to fire elongated or cylindroconoidal projectiles."

Old guns are to be strengthened by boring them out and inserting a lining consisting of "a hollow, close-fitting metallic cylinder, preferably of steel." The lining is fixed in its place by "shrinking, or by employing screws or pins." When the lining is of bronze or soft metal the breech end of the gun is enlarged, and the lining is expanded into the enlarged part.

[Printed, 4d. No Drawings.]

A.D. 1861, July 12.—N° 1758.

ADAMS, JOHN.—"Improvements in revolving fire-arms, and in cartridges for the same."

The barrel and the frame or opening in which the charge chamber revolves are made from one piece of metal, and are attached to the frame which carries the lock by suitable screws. The chambers are loaded by pushing into them cartridges made on the "Lefauchaux" principle, by means of a sliding plunger, which is also used to force out the empty cartridge cases. When

ordinary ammunition is employed the rotating cylinder used for the "Lefauchaux" cartridge is removed, and replaced by one having chambers suitable for firing the ordinary ammunition.

[Printed, 10d. Drawing.]

A.D. 1861, July 19.—N° 1824.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Lewis Wells Broadwell.*)—"Improvements in breech-loading ordnance, applicable also to small arms."

The breech end of the gun is closed by a breech block, which is made to slide up and down in a transverse opening made in the gun. The breech block is moved by "toggles connected to a shaft worked by a detachable lever handle." In the face of the breech block is fitted an expanding ring, which, when the charge is fired, expands and makes a gas-tight joint.

[Printed, 1s. Drawings.]

A.D. 1861, July 20.—N° 1831.

ROBERTS, THOMAS, and DALE, JOHN.—(*Provisional protection only.*)—"Improvements in the manufacture of gunpowder."

In making gunpowder, nitrate of soda is to be used "in place of or in combination with nitrate of potash." A substance is to be added "which will effloresce, so as to correct the tendency of the other material or materials to become moist." For example, "the anhydrous sulphate of soda and magnesia."

[Printed, 4d. No Drawings.]

A.D. 1861, July 24.—N° 1853.

SIDEBOTTOM, JOHN.—"Improvements in fire-arms and ordnance."

The improvements are based upon those described in the Specification of former Letters Patent dated Jan. 15, 1861, N° 109. The recoil of the gun is broken, and regulated by causing a break or clip to act upon a scroll or screw formed upon the periphery of the gun, so as to convert its backward motion into a rotating one.

[Printed, 6d. Drawing.]

A.D. 1861, July 25.—N° 1871.

ROBERTSON, CHARLES.—“Improvements in sights for fire-arms.”

A thin bar of metal, of nearly the length of the barrel, is hinged at the muzzle end, and forms a “sight-bar.” When firing at point blank range the sight-bar lies flat upon the top of the barrel; for increased distances the bar is raised by a support at the breech end of the barrel to the required height, and the eye takes aim by looking along the raised sight-bar. A traversing motion may be given to the back sight, which is carried at the raised end of the sight bar, so as to enable proper allowance to be made for wind.

For double-barrel guns the sight bar may be attached to the centre rib.

[Printed, 8d. Drawing.]

A.D. 1861, July 26.—N° 1873.

BOURNE, JOHN FREDERICK.—“Certain improvements in the construction, armament, and equipment of batteries, floating or otherwise, for war purposes.”

The sides of a fixed or floating battery is formed of three or more layers, by bolting between two plates one or more layers of angle or T-iron bars. Layers or sheets of india-rubber or other elastic substance or asphalte mixed with lime or sawdust may be placed between the plates. The bolts for attaching the plates are welded to them.

The porthole of the battery is made of a circular ring of wrought iron, which is made to serve as a socket for the head or ball end of the carriage carrying the gun. The gun may be worked by hydraulic power, which gives motion to the machinery of the gun-carriage. Elastic ropes and springs are used to break the recoil. The porthole is entirely closed by the muzzle of the gun, and aim is taken through a side hole, and the gun is laid by means of adjustable parallel bars.

A wooden ship is armour plated by stripping its external planking, and inserting diagonal bars, to which armour plates are attached.

[Printed, 8d. No Drawings.]

A.D. 1861, July 29.—N° 1887.

STURROCK, GEORGE.—“Improvements in the construction of breech-loading fire-arms.”

The charge chamber is made “to open out clear of the barrel by a lever, which, when pressed upwards by the hand, raises a slotted wedge plate from between the face of the fore end or false breech and back end of the chamber, and allows the chamber to slide backwards upon a longitudinal bolt hinge lying parallel with the axis of the gun.” This motion enables the fore end of the chamber, “which is cylindrical and slightly coned,” to be withdrawn from the recessed end of the barrel, and be moved on one side to receive the charge. Lefauchaux cartridges may be used, or ordinary cartridges be inserted from the front, and be fired by caps.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, July 31.—N° 1904.

HOLLAND, HARRIS JOHN, and PAYTON, WALTER.—“Improvements in breech-loading fire-arms.”

The breech end of the barrel is closed by a sliding plunger. When the piece is to be loaded, a collar, which fits on the screwed end of the barrel, is turned partially round by a lever, until an opening in the collar coincides with an opening in the breech end of the barrel. Through these openings the plunger is drawn back to admit the charge. The plunger is then pushed into its place, and the collar turned so as to close the opening.

Or the barrel or barrels may be hinged to the stock, and by turning down a handle the barrel is unlocked, pushed forward, and turned down to receive the charge at its rear end. “A notch or slot is made in the rear end” of a projection formed on the barrel or barrels, “into which engages, when the breech is closed, a corresponding projection on the seat” attached to the stock.

[Printed, 1s. 4d. Drawings.]

A.D. 1861, August 3.—N° 1933.

VAVASSEUR, JOSIAH.—“A new or improved transportable machine or apparatus for rifling cannon.”

The rifling machine works upon a suitable bed, which is mounted on four wheels, and may be moved up to the gun

required to be rifled. The muzzle of the gun is held by means of "a bracket and chuck having a hole large enough to receive the muzzle." On the axles of the wheels are "fitted eccentrics, by means of which the wheels may be raised or lowered," so that the bed may be made to rest on suitable standards, or on the wheels. The rifling bar is made hollow, with "internal rod, cone, and cutters for rifling and cutting the grooves as the cutters are coming from the breech towards the muzzle;" the cutters are made "to recede while the bar is running up the gun."

[Printed, *8d.* Drawing.]

A.D. 1861, August 7.—N^o 1964.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Alem Rousseau.*)—"Improvements in certain descriptions of "breech-loading fire-arms."

The barrel is hinged to the stock, and is "tilted" or turned down to receive a cartridge made on the Lefauchaux principle.

Instead of being ignited by striking a projecting pin above, the cartridge is ignited "by an upward stroke of a percussion spring" acting from below, being "enclosed in the stock settings." The spring has a hammer face, which strikes a piston which works upwards through an orifice in the barrel, and ignites the priming of the cartridge.

[Printed, *6d.* Drawing.]

A.D. 1861, August 9.—N^o 1980.

HAYCRAFT, GEORGE.—"Improvements in powder flasks."

The neck of the powder flask is formed by a tube, one open end of which projects into the flask, the other end being closed by a cap or lid. Within this tube is a second or lower tube closed at the bottom, and projecting a short distance into the upper tube. Apertures are made in the sides of each tube; when these are made to coincide by turning the tubes partially round, powder is allowed to enter; by turning the tubes back the apertures are closed. The tubes are supported and connected by means of suitable pins or studs working in grooves.

Instead of apertures being made in the sides of the tubes, the tubes may have perforated discs inserted in their lower parts, which may be made to coincide or not by turning the tubes.

[Printed, *8d.* Drawing.]

A.D. 1861, August 15.—N^o 2033.

WEBLEY, PHILIP, and WEBLEY, THOMAS WILLIAM.—
(Provisional protection only.)—"A new or improved elevating
rifle sight."

Elevating sights have slides, which are to be raised by a rack and pinion motion. The rack is formed "in the middle of the
upper side of the leaf or flap." The pinion "engages with the
rack," and on one end of its axis is "a milled head." A wind
guage arrangement may be also employed.

[Printed, 4d. No Drawings.]

A.D. 1861, August 15.—N^o 2042.

MURCOTT, THEOPHILUS, and HANSON, CHARLES.—"Im-
provements in breech-loading arms."

The charge chamber is moveable, and is turned upwards upon a horizontal axis to receive the charge. A wedge-shaped block is made to move in an opening behind the charge chamber, and is moved by a lever that lies under the trigger guard. The lever acts upon a curved tail piece attached to the chamber, and moves down the wedge-shaped block, and also throws up the mouth of the charge chamber, to allow the charge to be inserted. When the lever is pressed upwards it moves the charge chamber into its place in a line with the barrel, and also presses up behind it the wedge-shaped block.

[Printed, 6d. Drawing.]

A.D. 1861, August 21.—N^o 2093.

RICHARDS, WESTLEY.—"Improvements in rifles and pro-
jectiles."

The barrel of the breech-loader is made to have a slight longitudinal movement in the stock, and is turned down upon a horizontal axis, or "tipped" to allow the piece to be charged. The barrel is moved by means of a lever which "is turned, so as
to project out at right angles from the side of the rifle." A cam action worked by the lever moves the barrels and fastens them when in position.

Projectiles suitable for breech-loaders are made with a projecting rim at the rear end, which holds the projectile in place

when charged, and causes it to take the rifling when the charge is exploded.

A hinged flap or leaf is used for the sight; it is hinged to a bed that slides "transversely in a base plate" fixed upon the barrel.

[Printed, 1s. Drawings.]

A.D. 1861, August 23.—N° 2104.

WHITWORTH, JOSEPH, and HULSE, WILLIAM WILSON.—
"Improvements in sights for small arms and ordnance, and in
"fitting apparatus used with small arms."

The slide attached to the sight is made to move up and down the leaf or standard, by means of a rack and pinion motion, acting on both sides of the rifle sight. A micrometer wheel is used for measuring the adjustment where great accuracy is required. The front sight is attached to the nose cap, and has a transverse motion. Two tubular stems are used for fitting apparatus. In the hollow tubes are fitted spare nipples or pickers; the tubes are so made that they may be put together so as to form a key.

[Printed, 10d. Drawing.]

A.D. 1861, August 26.—N° 2128.

HADDAN, JOHN COOPE, and MINASI, CARLO.—(*Provisional protection only.*)—"Improvements in the manufacture of projectiles and of cartridges."

Elongated projectiles are to be made with a belt of soft metal attached to their fore part, with a recess in rear of the belt to facilitate expansion. Swells or projections of hard metal may be formed on the rear part of the projectiles. Shells are to be made of parts fitted together, some being weaker than others, so that the projectile may break up into the pieces required. The cap of the projectile may be made "removeable" to allow of the charge being readily inserted. The tube inside the shell in which the striker moves is made of a conical form, so that the striker may effect ignition in any required direction.

Cartridges are to be covered with paper, which is perforated or otherwise divided in parts, so as to facilitate the ignition of the powder contained in them. The cartridges may be closed with

a stopper of cork or other material to prevent a escape of the powder.

[Printed, 4d. No Drawings.]

A.D. 1861, August 27.—N° 2132.

PELTIER, EMILE.—“Improvements in the manufacture of “metallic boxes, and in machinery employed therein.”

Metallic boxes, suitable for holding gunpowder and other purposes, are made by fastening the sides with “bezil setting or “jumped joints, instead of the soldering, brazing, or welding” hitherto used. The pieces of sheet metal are formed of the shape required for a box, and are placed separately in a suitable matrix in a self-acting punching press, which closes and finishes the joints.

[Printed, 10d. Drawing.]

A.D. 1861, September 4.—N° 2203.

SCHNEIDER, FRANÇOIS EUGÈNE.—“Improvements in cart- “ridges for breech-loading fire-arms, and in the machinery for “manufacturing the same.”

Cartridges are made with the ignition cap placed in the centre of the rear and embedded in a packing of pressed paper, so that they are discharged by central fire. The ignition cap may have the powder contained in an annular chamber formed in its rear. The cap may also be of the usual cylindrical form, and inside it is an anvil so shaped or grooved on its sides that, while the anvil nearly fills the cap, lateral space is left for the passage of the flame. The cap is enclosed in a cylindrical cover which is firmly embedded in a paper packing. Self-acting machinery is employed for fixing the central fire ignition firmly in the rear of the cartridge. The cartridge case, in which the cap and its cover and the paper packing are placed, is held in a strong mould, and while so held the paper packing is compressed by a plunger, from the centre of which projects a punch, so that the packing is compressed and a suitable hole is punched simultaneously while the cartridge case is firmly held in the mould. Self-acting saws may be used for grooving or shaping the anvils.

[Printed, 1s. 2d. Drawings.]

A.D. 1861, September 6.—N° 2233.

HARRISON, EDWARD, and YATES, THOMAS SHUTTLEWORTH.—(*Provisional protection only.*)—"A certain compound or certain compounds to be used as a substitute for gunpowder."

It is proposed to employ as a substitute for gunpowder a mixture composed as follows :—

Chlorate of potash	-	-	56 parts.
Yellow prussiate of potash	-	-	28 parts.
Starch	-	-	4 parts.
Sulphur	-	-	7 parts.
Charcoal	-	-	5 parts.

Instead of 5 parts of charcoal, $2\frac{1}{2}$ parts of coal or cannel may be employed.

[Printed, 4d. No Drawings.]

A.D. 1861, September 11—N° 2260.

THOMAS, WILLIAM LYNALL.—"Improvements in projectiles."

The projectile is made "cylindrical, except for a small distance from the tail end, where it is by preference oval in section; it is then formed cylindrical down to its base." A hard metal sabot is placed on the rear of the projectile, "in the inner surface of which steps" are formed corresponding with indentations in the projectile, so arranged that "annular spaces are left between the outside of the shot and the inside of the sabot."

The space "between the shoulder or flange on the head and the top of the sabot" is filled with lead or soft metal. "Upon the firing of the projectile the sabot is driven up on the rear end thereof," and the lead jacket is expanded into the rifle grooves of the gun.

[Printed, 6d. Drawing.]

A.D. 1861, September 13.—N° 2284.

NEWTON, WILLIAM EDWARD.—(*A communication from William McCord.*)—"Improvements in guns."

Self-acting breech-loading apparatus is employed for introducing into the breech end of the gun metallic cartridges or cartridge chambers from a feeding hopper by means of "reciprocating and oscillating jaws." The discharged cartridges are removed by means of bars acting with a toothed segment and slide. A constant discharge is kept up "by the simple act of turning a crank,"

F. A.

M.

which works the self-acting feeding and removing apparatus. The nipple ends of the cartridges or cartridge chambers are covered with a cap having "a headed or valve pin working loosely in an opening immediately opposite the percussion cap on the nipple." Circular openings are formed "in the ends of the cartridge chambers," in which are inserted elastic rings of india-rubber or other material, whose "forward portions project slightly therefrom."

[Printed, 1s. Drawings.]

A.D. 1861, September 16.—N^o 2307.

FRY, GEORGE.—(*Provisional protection refused.*)—"Improvements in sights for rifles and other fire-arms."

The Provisional Specification stated that the invention consisted in improvements "to give and mark the elevation required for portable fire-arms and artillery."

[Printed, 4d. No Drawings.]

A.D. 1861, September 20.—N^o 2355.

BURNAND, JAMES.—"Improvements in the means of fastening or securing the handles of table knives and forks, daggers, and other similar articles."

Handles or hafts of knives or daggers are fastened to the tang by making a cavity in the handle or haft; the tang, which is previously coated with tin or solder, is then introduced into the cavity, and molten lead or other suitable mixture is then run in and holds the tang of the blade firmly connected with the haft.

[Printed, 6d. Drawing.]

A.D. 1861, September 23.—N^o 2375.

HELY, ALFRED AUGUSTUS.—(*Provisional protection only.*)—"Improvements in the construction of portable fire-arms."

A rifle or gun barrel is proposed to be attached to a straight staff, having a sword bayonet or scimitar mounted upon it, and a moveable cross guard. The barrel may be attached to a lance staff, having a blade that may be removed when required.

[Printed, 4d. No Drawings.]

A.D. 1861, September 26.—N° 2406.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Charles Sweney.*)—(*Provisional protection only.*)—"Improvements " in knapsacks."

In order to enable a knapsack to be suspended from a man's shoulders, without touching his back, it is proposed to attach near each end of the back of the knapsack a strip of hoop iron, bent at its ends, and connected with the top and bottom sides of the knapsack. To these strips cross pieces and pads are attached, and also curved shoulder plates, so as to fit the shoulders and support the knapsack, and hold it in its place by means of suitable straps.

[Printed, 4d. No Drawings.]

A.D. 1861, September 30.—N° 2439.

HICKMAN, HENRY.—(*Complete Specification, but no Letters Patent.*)—"An improvement or improvements in protecting the " locks and sights of fire-arms."

A cover, made of gutta percha or other suitable waterproof material, is shaped so as to cover the lock and sight of the gun or rifle. It is "cut to something like the form of the upper " leather of a shoe, and bound over a metal wire frame." The cover may be removed readily, and be carried in the pocket.

[Printed, 4d. Drawing.]

A.D. 1861, October 1.—N° 2445.

NIGHTINGALE, ROBERT.—(*Provisional protection only.*)—"Improvements in markers' butts or mantelets."

Instead of using open mantelets or markers' butts, closed ones are to be employed, all four sides being made bullet proof. On the top of the mantelet is to be fixed a camera, which will project upon a table inside the mantelet an exact image of the target, which image is made to fall upon a sheet of divided or ruled paper. To enable the marker to hear well, and obtain ventilation, bent tubes are fitted to the closed mantelet. Signal flags are attached to the peripheries of discs, which are turned by handles inside the mantelet, and indicate the position of a shot, and whether high or low.

[Printed, 4d. No Drawings.]

A.D. 1861, October 1.—N° 2446.

SCOTT, JOHN WILLIAM.—(*Provisional protection only*).—"An improvement in gun wads."

Gun wads "which shall not be easily compressible," are to be made from leather, by preference "sole butt leather." The under wad, which is placed next to the powder, is to be made concave on the side placed "uppermost in the gun."

[Printed, 4d. No Drawings.]

A.D. 1861, October 2.—N° 2453.

WYLEY, ANDREW.—"Improvements in fire-arms."

The breech-loading fire-arms are made with a moveable charge chamber, which is "tilted up" to receive the charge, and is made to engage in the breech "by means of segments of screw threads." The piece is made self cocking and self capping, or it may be cocked or capped by hand. The caps are placed in a tubular recess in the stock, and are moved onwards by a self-acting apparatus actuated by a spiral spring. The back sight consists of two parallel legs or wires, connected with a cross piece; it "slides up and down in two parallel holes in the fore part of the breech case, upon opposite sides of the barrel." A short spirit level may be used. The fore sight may be provided "with a plug of white enamel" to make it visible against a dark object. A "retractile foresight" may be employed. A ramrod is made with a head having a number of india-rubber rings let into grooves formed in it to act as cleaners of the inside of the rifle barrel.

[Printed, 1s. 10d. Drawings.]

A.D. 1861, October 3.—N° 2465.

HADDAN, JOHN COOPE, and MINASI, CARLO.—(*Provisional protection only*).—"Improvements in the mode of discharging cannon, and in apparatus for facilitating the proper aiming with fire-arms."

A rod or sliding plunger, to which a percussion cap is attached, is to be used for discharging guns. The rod is to pass through the vent piece of breech-loaders or the vent of other guns. In order to enable the butt of a rifle to be adjusted to suit the con-

venience of the marksman when aiming at objects at a greater or less distance, the butt, or part of the butt, is to be connected with the barrel by a hinge or joint. Sliding or other adjustable bearing pieces may be attached to the butt.

For practising at reduced or miniature targets darts, impelled by a spring, are to be employed.

[Printed, 4d. No Drawings.]

A.D. 1861, October 7.—N° 2498.

WALKER, BERNARD PEARD.—(*Provisional protection only.*)—
“Improvements in rifle sights and rifle sight guards and a new
“or improved rifle cleaner.”

In order that a marksman may obtain a full view of an object aimed at, the V notch in the foresight is to be made of a “skeleton
“form,” instead of being cut in a solid plate or piece of metal. An arched rifle sight guard, formed of bent sheet metals, is to be made to cover the fixed sight. A “tubular piece of vulcanised
“india-rubber held by its middle” is to be attached to an ordinary rifle cleaner.

[Printed, 4d. No Drawings.]

A.D. 1861, October 7.—N° 2501.

KEILLER, WEDDERSPOON.—(*Provisional protection refused.*)—
“Improvements in signalling for rifle practice.”

The invention was stated to consist “of a ball or disc made to
“move from place to place on the target, or on a signal board
“erected for the purpose, so as to indicate” where the ball hits. If the ball misses, “the signal indicates the direction in which the
“ball has passed. No means of giving motion to the ball or disc were described or referred to.

[Printed, 4d. No Drawings.]

A.D. 1861, October 9.—N° 2514.

SIEVIER, ROBERT WILLIAM.—“Improvements in batteries for
“the purposes of war.”

In building ships, batteries, or steam rams, where great strength is needed, the “lattice-work” principle of construction is employed,

as ordinarily adopted in constructing bridges. A covering of lead is placed upon the plates forming the battery; "sheet lead laid on "a piston of iron will turn the shot easily away."

Furnaces are used for heated red-hot shot. Air is supplied to ships between decks by means of blast cylinders.

Tanks of incendiary liquids are connected with forcing pumps, so that jets of the liquid may be forced upon an enemy's ship and burn it.

Guns made to fire under water are employed; also telescope iron masts and double or twin screws. Shells are charged with highly inflammable materials. Electricity is employed for discharging guns. Land batteries are constructed of iron plates bolted together to form shields, and are covered outside with sheet lead.

[Printed, 1s. 8d. Drawings.]

A.D. 1861, October 9.—N° 2522.

CURTIS, FREDERICK.—"A new and useful improvement in "fire-arms."

In order to make breech-loading guns gas tight at the breech, "an expanding tube or breech pin is employed" as a "gas-check," and is made to "form part of the arm itself." The "breech pin "and breech carrier" are made in two parts, so connected that the breech pin may be introduced into and withdrawn from the barrel in a line with its axis. The breech carrier is actuated by means of the guard which turns downwards upon a joint.

[Printed, 1s. Drawings.]

A.D. 1861, October 10.—N° 2533.

CHRISTOPH, LOUIS, HAWKSWORTH, WILLIAM, and HARDING, GUSTAVUS PALMER. — "Improvements in the "manufacture of cast-steel and other metal tubes, and in the "machinery or apparatus employed therein, parts of which "improvements are applicable to the manufacture of gun barrels "and ordnance, and to the rifling of same."

Tubes of steel or other metal, suitable for being made into gun barrels or for other purposes, are drawn or rolled or drawn and rolled either in a cold or hot state. A "cylindrical piece of cast

"steel of sufficient ductility for drawing" is taken; a hole is drilled through it, and it is then passed on to a mandril, and is forced through a draw plate. The mandril has two or more swellings thereon, the one which comes into action first, being smaller than the others, which gradually increase in size.

For gun barrels conical or tapered tubes are made by employing a conical mould or matrix, "into which the tube is introduced after it has been rolled to a tapered form;" through this tube a mandril is drawn, so as to expand and elongate the tube. By making suitable projections on the mandril, and giving it rotatory motion "during the time it is being drawn through the tube," the gun barrel is made with a rifled bore. In the manufacture of the drawn conical steel tubes the cylindrical tube, made by drawing, is passed through rolls having tapered grooves made therein, a mandril being inserted in the tube. The tube having been thus made of the requisite taper form, it is finished by "internal drawing," a mandril being drawn through the tube while it is held in a mould or matrix.

[Printed, 10d. Drawing.]

A.D. 1861, October 12.—N° 2546.

CORKE, EDGAR.—(*Provisional protection only*).—"An improved instrument to be attached to the bayonet or barrel of a rifle or other fire-arm for estimating distances."

A guage to aid in judging the distance of objects aimed at is to be attached to the end of the barrel of a rifle or to the bayonet. The guage has a vertical aperture formed in it, furnished with a vertical slide, each side of the aperture being "marked with a scale to suit objects of different heights, varying from fifty yards and upwards."

[Printed, 4d. No Drawings.]

A.D. 1861, October 14.—N° 2563.

WALKER, MOWBRAY.—(*Provisional protection only*).—"Improvements in breech-loading rifles."

The breech end of the barrel is to be closed by a sliding plunger, which is jointed to enable a part of it to be withdrawn, and allow the cartridge to be inserted; or the breech chamber may be made of "a short cylinder of cast steel, leaving an aperture

" to receive the charge bored at right angles with its own axis." The piece is to be loaded by making the breech chamber turn partially on its axis to receive the cartridge, and then turning it back to discharge the piece.

[Printed, 4d. No Drawings.]

A.D. 1861, October 16.—N° 2577.

BIDDELL, WILLIAM.—(*Provisional protection only.*)—"Improvements in the manufacture of shot."

Iron is to be used for making the shot, alloyed "with nickel, arsenic, or lead, preferring the oxides of those metals." One ounce of nickel, or eight oz. of arsenic, or two pounds of lead may be mixed with ten pounds of molten iron. The hot metal is "granulated by being run over a polished surface through combs which regulate the size, the polished surface being agitated during the operation." The shot is to be coated, "to prevent oxydation," by galvanising, or tinning, or by using mercury.

[Printed, 4d. No Drawings.]

A.D. 1861, October 17.—N° 2581.

HAYES, REUBEN.—(*Provisional protection only.*)—"Improvements in gun and ammunition carriages."

Light gun carriages are to be used, so constructed that they may be drawn by men; they are to be mounted on three wheels. The horizontal adjustment of the gun is to be effected by "a handle, projecting from the swivel towards the gunner in the rear." The vertical motion is to be "obtained by a rack and pinion."

[Printed, 4d. No Drawings.]

A.D. 1861, October 18.—N° 2593.

CROSTHWAITE, JOHN, and ARMAN, THOMAS EDWARD.—(*Provisional protection only.*)—"Improvements in the construction of targets and in signal apparatus to be used therewith."

The target is to be made of strong plate iron, having a circular part in the centre mounted on pivots, so that it may be turned round to present either face to the front of the target. The swivelling centre plate is held in its position by a bar; when this

is removed by the marker, who is stationed at the back of the target, a danger signal is indicated. When the marker turns the clean face of the circular plate to the front and replaces the bar the danger signal disappears. The station of the marker may be covered by a shed, and the target may be mounted on wheels. Signals are made by means of semaphore arms attached to a pole, which by their angle are to be made to indicate where the bullet hits in relation to the centre of the bull's-eye.

[Printed, 4d. No Drawings.]

A.D. 1861, October 18.—N° 2601.

ROBERTSON, PATRICK.—(*A communication from Algernon Johnston and Lorenzo Dow.*)—"Improvements in the manufacture of cartridges."

"Paper, cloth, or other texture" is treated "with nitric acid (NO_3) or with nitric acid in combination with sulphuric acid (SO_3), or with any nitrate alone, or in combination with sulphuric acid, as in the production of gun cotton." The material so prepared is dried and then treated with a "solution of chlorate of potash (KO, CEO_3), or other preparation affording oxygen; this renders the material highly inflammable." The material is next coated with collodion or its equivalent to make it "compact and waterproof." The prepared paper, or other material, may be used for the cover or case of a cartridge made up of gunpowder and projectile in the usual way, the collodion being applied when the cartridge is made up.

[Printed, 4d. No Drawings.]

A.D. 1861, October 18.—N° 2603.

COWAN, THOMAS WILLIAM.—(*Provisional protection only.*)—"Improvements in the construction of breech-loading ordnance."

The breech of the gun is to be closed by a breech piece, "mounted upon an axis or trunnion at right angles" to the axis of the gun. In this breech piece are formed recesses or charge chambers, which are to be brought successively in a line with the bore of the gun and discharged. While one chamber is in its place the other chambers may be charged.

[Printed, 4d. No Drawings.]

A.D. 1861, October 19.—N° 2619.

BLOXAM, HENRY.—“Improvements in sights for rifles and
“ordnance.”

To enable a marksman to know when the back sight of his piece is exactly perpendicular a small vibrating pendulum is attached to the sight. The pendulum is “mounted on a transverse pin, and attached to a suitably shaped piece of metal, which is attached to the sliding bar of the rifle or cannon sight by means of two small gripping springs.” The pendulum may be readily affixed to or removed from the sight.

[Printed, 6d. Drawing.]

A.D. 1861, October 24.—N° 2664.

CHESTERMAN, JAMES.—“Improvements in heating steel and
“iron, and in hardening and tempering steel, and in apparatus
“employed therein.”

Steel or iron intended to be used in the manufacture of various articles, including swords and bayonets, is heated “for the purposes of forging, annealing, hardening, and tempering, by passing the steel or iron through a tube” immersed in lead, or a flux contained in a vessel “protected from the action of the atmosphere.” The flux may consist of chlorides, alum, borax, and other minerals.

[Printed, 1s. Drawings.]

A.D. 1861, October 25.—N° 2679.

LOBB, JAMES.—(*Provisional protection only.*)—“Improvements
“in gunpowder suitable for blasting.”

In making blasting gunpowder, sawdust is to be substituted “for a portion of the charcoal and sulphur in the powder,” to prevent the smoke from being too offensive. Lime is to be added to the powder to counteract “the deliquescent property of the nitrate of soda or potash.”

[Printed, 4d. No Drawings.]

A.D. 1861, October 29.—N° 2703.

BAYLISS, OLIVER.—“Improvements in double-sighted double-
“rifle guns for military and sporting purposes.”

To make the aim of a double-barrel gun or cannon more true, and to avoid "the crossing of the balls," a top and bottom sight is fixed on each of the barrels; or a double top rib may be used "being double top and bottom sighted." The right-hand barrel may be sighted without sighting the left-hand barrel or vice versa. The muzzles of a double-barrel rifle are detached to allow a bayonet to be placed upon one of the barrels.

[Printed, 6d. Drawing.]

A.D. 1861, October 31.—N^o 2731.

MATHEW, BROWNLOW HUGH.—(*Provisional protection only.*)
—"Improvements in fire-arms and in cartridges."

Breech-loading guns are to be made with "a slot cut in the upper surface of the back end of the barrel," in which is inserted a compound jointed breech plug.

Four rifling grooves are to be made in the barrel, "with the sides converging towards the common centre," and with the lands "partially hollowed between the grooves."

The back sight is to be made with a notch to which "an additional and independent motion is given," and "two points" are added, which are "capable of lateral adjustment to and from each other."

The cartridge is to be made "with a flange projecting from the rear, and with a tail carried from the flange, in the end of which a percussion cap is inserted." The tail may in some cases be dispensed with.

[Printed, 4d. No Drawings.]

A.D. 1861, November 1.—N^o 2736.

THOMAS, LYNALL.—"Improvements in rifled ordnance and projectiles."

In order to insure "the entering of the shot in cannon," and to equalize "a minimum friction on the surfaces," round grooves having rounded shoulders are employed, and the curved surfaces "in both the cannon and shot are identical." The sectional form of the gun may be described generally as that of the ratchet wheel, with the corners and shoulders and sides of the grooves rounded and curved. "The surfaces of the shot and cannon

" which are brought into contact when the shot is fired," are made to " radiate each to the axis of its own particular body."

[Printed, 10d. Drawings.]

A.D. 1861, November 5.—N^o 2774.

BROOKS, EDGAR.—" An improvement or improvements in the " manufacture of bayonets."

Bayonets are made by stamping rough forms or blanks in dies worked in suitable presses. " The steel of which the blade is " formed is shut or welded on to the iron of which the socket " is made, and the socket and neck of the bayonet and the " shoulder of the blade are formed in the ordinary manner." The blade is made " nearly square in section." A pair of dies " of " sufficient size to operate upon and fashion the whole of the " blade at the same time " may be employed, or two or more pairs of dies may be used.

[Printed, 10d. Drawing.]

A.D. 1861, November 6.—N^o 2785.

DAVIES, GEORGE.—(*A communication from Benjamin Franklin Joslyn.*)—(*Provisional protection only.*)—" Improvements in fire- " arms and ordnance."

Breech-loading guns are to be made with a hinged breech piece, which is made to " fit over the rear end of the barrel," and is attached thereto by means of projecting lugs. Revolvers are to be made with a revolving " clutch cylinder," which is turned the requisite distance by the act of cocking the hammer. The ramrod is to be worked by a rack and toothed segment.

[Printed, 4d. No Drawings.]

A.D. 1861, November 8.—N^o 2805.

SIEMENS, CHARLES WILLIAM.—(*Provisional protection only.*)—" A vessel and gun or guns connected therewith for use in " naval warfare."

It is proposed to employ guns which are discharged below the surface of the water in a vessel protected by armour plates and very low upon the water. The gun may be made a breech-loader, and the entrance of the water is prevented by using suitable valves or sliding wedges. A projectile weighing 15 cwt.

is to be fired at a low velocity of about 400 feet per second ; it is to be made to contain a large bursting charge.

[Printed, 4d. No Drawings.]

A.D. 1861, November 11.—N° 2832.

SHANNON, ALEXANDER.—(*Provisional protection only.*)—" An improved construction of cartridge for accelerating the flight of " projectiles."

Rifle and other projectiles are proposed to be fired " with greatly " accelerated velocity " by inserting, at the required intervals in the powder charge, perforated discs. The separated portions of the powder charge are said to be ignited at successive intervals, so that the projectile is first started gradually, and then its velocity is accelerated without risk of injuring the gun.

[Printed, 4d. No Drawings.]

A.D. 1861, November 13.—N° 2852.

ARMSTRONG, Sir WILLIAM GEORGE.—(*Provisional protection only.*)—" Improvements in the means of firing or igniting " explosive projectiles."

The proposed improvements are based upon those described in the Specification of former Letters Patent, dated April 10, 1858, N° 779, which related to the use in percussion shells of a striker, which before discharge is held by a pin or wire. The pin or wire is broken when the projectile is propelled forward, allowing the striker to recede to the rear end of a chamber in the projectile ; on impact it is urged forward and ignites a percussion patch.

Instead of employing a pin or wire, the striker is to be " secured " by a metal hoop resting at the lower end on projections from the " striker, and abutting at the upper end against the cover of the " case." When the gun is fired the " vis inertiae of the hoop " causes it to shear off the projections on the striker," which is then liberated, and when the projectile strikes, is free to run forward and ignite a percussion patch.

[Printed, 4d. No Drawings.]

A.D. 1861, November 13.—N° 2856.

VAUGHAN, JOSEPH.—*Provisional protection only.*—" An improvement or improvements in the manufacture of bayonets, " and in apparatus or machinery to be employed therein."

Bayonets are to be made by stamping "the blank for the blade
" in dies operating upon either a portion of the length or the
" entire length at one time."

The dies are to be formed "with sinkings suitable for producing
" the shape or sections" required for the blank.

[Printed, 4d. No Drawings.]

A.D. 1861, November 18.—N° 2898.

PRODON - BONNETON, GUILLAUME, and PRODON, MARTHE GUILLAUME.—"Improvements in means or apparatus
" for rolling metals."

Sword blades, bayonets, and other articles are made by rolling apparatus. A matrix or mould of the required shape is formed in a ring, which is then keyed or fastened upon the axis of one of two rolls. The metal intended to be made into a given shape is then passed between the rolls, and is forced into the pattern formed on the ring. By changing the ring, and replacing it by another of a different pattern, the same rolls may be made to produce articles varying, as required, in form or size.

[Printed, 1s. Drawings.]

A.D. 1861, November 19.—N° 2908.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from George White.*)—"Improvements in breech-loading fire-arms."

The breech is opened and closed by the action of "a combined
" revolving plug and shear plate, whereby the opening and closing
" of the breech and the shearing off of the end of the cartridge is
" accomplished by a semi-revolution performed twice, or a whole
" revolution once performed by the same plug." The breech plug is a "cylinder of larger diameter than the bore of the gun;
" it is fitted in a socket formed in the stock, and immediately in
" the rear of the barrel." The plug when worn is "capable of
" adjustment." A "flanged ferrule" is employed, so as "to form
" a self-adjusting shear plate and gas joint."

[Printed, 8d. Drawing.]

A.D. 1861, November 20.—N° 2918.

THOMAS, LYNALL.—"Improvements in the mode of manufacturing and constructing wrought-iron ordnance."

In order to "avoid the defective welding of guns made of coils," coils of sheet or bar iron are wound round "upon a staff or core bar, or upon each other, in such manner as to avoid as much as practicable the necessity for having welded joints or surfaces at right angles, or nearly so, to the axis of the bore of the gun." The staff or core bar is forged or rolled, and is made of "fine grained, hard, tough, and elastic iron, or iron alloyed with carbon." Upon this are wound sheets or coils of various sizes, and the coiled mass is "welded together, and drawn slightly down under very heavy hammers." In some cases the coils are welded upon a mandril, so as to form a hollow cylinder.

[Printed, 4d. No Drawings.]

A.D. 1861, November 26.—N° 2978.

PURCHASE, GEORGE LAMBTON.—(*Provisional protection only.*)—"Improved sight apparatus and sight for fire-arms and ordnance."

A moveable foresight, capable of being fitted upon the barrel and removed from it readily, is to be used. The sight is mounted on a frame by which it is attached to the fire-arm.

The sight may be attached to a bar or rod "whose length is transverse to the axis of the barrel," and may have a transverse motion on the bar.

[Printed, 6d. Drawing.]

A.D. 1861, November 27.—N° 2992.

SOLLER, JOHN HENRY.—(*Provisional protection only.*)—"Improvements in cases for holding & supplying caps to the nipples of rifles and other fire-arms."

A case or box is proposed to be used for holding and delivering percussion caps. It is tapered, and so constructed that at the end where the caps are delivered "only one can pass out at a time." At the orifice are two spring pieces, which embrace the body of the cap and grip it slightly, the one curling round so as to prevent the cap moving beyond it in a direct line.

[Printed, 4d. No Drawings.]

A.D. 1861, November 30.—N° 3018.

GIBSON, JOHN WILLIAM.—(*Provisional protection only.*)—"Improvements in ordnance, applicable also to small arms."

The vent piece or breech piece used for closing the rear of breech-loading guns is to be made of sufficient length to allow an orifice to be made in it, through which the charge is inserted, and also to allow the breech piece to be moved, so as to bring its solid part opposite to the bore and close it.

To protect the sliding breech piece, a suitable projection is forged upon the gun. The breech piece may be moved to and fro or up and down by a screw or lever motion.

[Printed, 4d. No Drawings.]

A.D. 1861, December 6.—N° 3056.

SEELEY, EDGAR DARIUS, WELLS, THOMAS FOSTER, and PHILLIPS, GEORGE ARTHUR.—(*Provisional protection only*).—
“An improved apparatus for holding and placing percussion caps
“on fire-arms.”

A case for holding percussion caps is to be made with a trough, in which the caps are placed, and a spring, acting on a piston, forces the caps to the mouth of the trough. The mouth is made rectangular, and a pair of holders holds the cap over a hole in the bottom of the trough, which enables the cap to be placed upon the nipple of the gun.

[Printed, 4d. No Drawings.]

A.D. 1861, December 6.—N° 3062.

VETTERLIN, FREDERICK.—(*Provisional protection only*).—
“Improvements in breech-loading ordnance, and the projectiles
“to be used therewith, which may also be applied to small
“arms.”

The rear end of breech-loading guns is to be closed by a pair of sliding breech pieces, one of which is of a wedge shape. The breech pieces are moved transversely across the bore, the wedge acting so as to tighten the breech pieces in their place.

Projectiles are made with the centre part smaller than the ends, like a reel for thread. Rope or other fibrous substance is wound round the projectile to act as a packing to take the rifling.

[Printed, 4d. No Drawings.]

A.D. 1861, December 7.—N° 3072.

HUTCHINSON, WILLIAM NELSON.—“Improvements in projectiles and ordnance and in apparatus to be used therewith.”

Projectiles of a discoidal form are fired from a short chambered or unchambered gun. "The projectile may have its periphery " bevelled on both edges," or flat, "and of the same width as the " minor axis of the disc;" it may be made hollow to act as a shell. It is inserted in the gun edgewise, either in a vertical or horizontal plane, so as to enter the mouth or muzzle of the gun, which is "shaped so as to correspond to the edge of the shot " which fits up against the wad. The shot is held by a cord or " band, which is severed when the gun is fired. The barrel is " carried in a wrought-iron frame resting on a platform, the front " part of which carries guide bars to guide the course of the " projectile."

[Printed, 6d. Drawing.]

A.D. 1861, December 10.—N^o 3097.

NEWTON, WILLIAM EDWARD.—(*A communication from John Bryce and Benjamin de Forest.*)—(*Provisional protection only.*)—"Improvements in breech-loading cannon."

The breech end of the barrel is to be closed by means of an oblong block, which is removed to admit the charge. The front end is provided with a conical copper or soft metal collar to form a tight joint.

[Printed, 4d. No Drawings.]

A.D. 1861, December 10.—N^o 3098.

NEWTON, WILLIAM EDWARD.—(*A communication from Joseph Short.*)—"Improvements in knapsacks."

The knapsack is made of a single piece of cloth or other suitable material, cut in such a shape that the flaps will fold over and form a knapsack. The knapsack is supported by neck and shoulder straps, in such a manner that the knapsack is supported at its bottom and may fall away from the back of the wearer. The position of the knapsack is capable of being changed, so as to relieve the wearer upon a long march.

[Printed, 10d. Drawing.]

A.D. 1861, December 12.—N^o 3119.

SCOTT, JOHN WILLIAM.—"Improvements in wads for fire-arms."

Compound wads are made by attaching to a piece of leather of a cup or disc shape, by a rivet, or by glue or cement, "a leather

"valve rather larger in circumference than the bore." The valve when the compound wad is inserted in the barrel is uppermost. "A ring or annular valve of leather, cloth, or other suitable material" may be inserted in or fixed to the edge of the wad.

[Printed, 6d. Drawing.]

A.D. 1861, December 16.—N° 3154.

BARTRAM, WILLIAM, and HARWOOD, WILLIAM SHELDON.—"An improved apparatus for filling and ramming cartridges for breech-loading and other fire-arms."

The cartridge case intended to be charged is placed in a tubular receptacle, upon which is screwed a cap or collar through which a rammer is passed. The rammer is made hollow, and has a funnel-shaped top through which the powder is introduced into the cartridge case. Small shot are then poured through the tubular rammer. When breech-loading cartridges ignited by a side pin are charged, the pin is introduced through a side aperture made in the tubular receptacle.

[Printed, 6d. Drawing.]

A.D. 1861, December 18.—N° 3166.

SCOTT, ROBERT.—"An improved method of rifling or grooving the barrels of fire-arms and ordnance."

Rifling grooves are cut in such a manner as "to present the smoothest possible surface to the projectile," approximating as closely as possible to the cylindrical bore. The grooves have "the cross sectional of an arc of a circle, the radius of the arc being rather less than that of the interior surface of the barrel previous to grooving." The grooves "occupy the whole of the interior surface of the barrel." The points of intersection "form raised angular lands running spirally down the barrel."

[Printed, 8d. Drawing.]

A.D. 1861, December 21.—N° 3206.

BENNETTS, WILLIAM.—"Improvements in the mechanism required for and in the manufacture and composition of gunpowder."

Blasting powder is made by mixing "nitre, 65 lbs.; charcoal, 18 lbs.; sulphur, 10 lbs.; and lime 7 lbs." The lime is first

dissolved "in a sufficient quantity of water to bring the other " ingredients to a paste " when added to the solution, and ground in a mill. The paste is " taken out of the mill and passed " between rollers, one grooved and the other plain." The paste is thus formed into triangular strips, which are carried by an endless web over hot tubes or other heating surfaces. The dried strips are placed in " a brass bottomed sieve together with wooden " balls," and are broken into grains. Instead of lime, plaster of Paris or cement may be used, and other proportions may be mixed, according to the quality of powder required.

[Printed, 8d. Drawing.]

A.D. 1861, December 24.—N° 3215.

BODMER, LOUIS RUDOLPH.—(*A communication from Charles Hippolyte Tessier.*)—"Improvements in looms for the manufacture " of sacks, knapsacks, mattress cases, and other goods."

Seamless articles of single cloth, capable of being used for sacks, knapsacks, and for other purposes, are made by weaving them in an ordinary loom, the healds required to be so arranged as to weave a double cloth, " which has one selvage on the right and " one on the left, and which forms the body of the knapsack or " mattress case without seam."

[Printed, 10d. Drawings.]

A.D. 1861, December 27.—N° 3245.

McINTYRE, JAMES.—"Improvements in bomb-shells and " similar projectiles."

Compound shells are made by casting round a hollow projectile an outer casing or shell. Projections are formed upon the inner shell so as to hold it in its place. A bursting charge is placed between the outer and inner shell, and the inner shell may be charged with bullets ; or the spaces may be filled with powder or inflammable materials. Twisted or folded fuses are used to prevent the bursting of the interior charge or charges at the same time that the outer charge is ignited.

[Printed, 8d. Drawing.]

A.D. 1861, December 28.—N° 3250.

WARNER, ARTHUR.—"Improvements in the manufacture of " cases or receptacles for oil, fuses, and other articles used in the " military and naval services."

Cases for oil bottles or fuses are made from discs or flat pieces of zinc or tinned zinc, by the process of "stamping, raising, pressing, or spinning." For artillery fuses cases made of paper, lined with lead or tinfoil, are employed.

[Printed, 4d. No Drawings.]

A.D. 1861, December 28.—N° 3251.

HENRY, MICHAEL.—(*A communication from Mathieu Louis Michel Descoutures.*)—"Improvements in fire-arms, and in adapting bayonets or cutting or piercing weapons thereto."

A moveable breech, which oscillates or "turns on its fulcrum to the right or left," is employed for breech-loading guns. In needle guns the needle or striker has fitted round it "a shielding nut," to prevent the hammer from firing the charge prematurely. In "double-barrelled arms, where two cocks are used," either cock is made to act upon either striker. The bayonet is so arranged that "when stowed away it lies in the gun stock" in a tubular receptacle.

[Printed, 8d. Drawing.]

1862.

A.D. 1862, January, 2.—N° 22.

JEFFRIES, GEORGE.—"Improvements in breech-loading fire-arms."

Double-barrelled breech-loading fire-arms are made with the barrels mounted "on a centre or axis, on one side of the centre line of the piece, and at a distance of some inches in advance of the breech end of the barrels." The centre is carried in a bearing "connected with the false breech end, which is flat, and at right angles to the centre line of the piece." When the barrels are "partly turned round laterally about their axis," the breech ends are freed, and "moved a sufficient distance sideways to allow cartridges to be introduced." The barrels are returned to position, and then are retained in place by "a wedge piece," fixed horizontally under the barrels, and entering a recess in the false

breech. The same principle of construction is applied to pieces with a single barrel.

[Printed, 1s. 4d. Drawings.]

A.D. 1862, January 3.—N° 24.

NUGENT, EDWARD.—“Improvements in fire-arms.”

The cartridge or charge chambers are arranged in a feeding hopper, and conveyed to a self-acting carrier and feeding apparatus attached to the breech end of a light gun or field piece.

The carrier may be made to revolve, and the charge chambers or barrels are placed in grooves formed in it, and are brought up to the rear end of the gun, and when in line with its axis are firmly held and discharged. When the barrel of the gun becomes heated from being rapidly fired it may be removed, and be replaced by another barrel.

[Printed, 10d. Drawings.]

A.D. 1862, January 8.—N° 52.

JESSON, SAMUEL, BATSON, JAMES, MOORE, JOHN, and ROBERTS, JAMES.—(*Provisional protection only.*)—“Improvements in the manufacture of gun barrels and wrought-iron tubing.”

Gun barrels are to be made by welding together two half tubes. The half tubes are formed by rolling heated bars in grooved rollers. The edges of one half tube are made with ribs, which fit into corresponding depressions made in the other half tube.

[Printed, 4d. No Drawings.]

A.D. 1862, January 8.—N° 55.

STENHOUSE, JOHN.—“Improvements in rendering certain substances less pervious to air and liquids.”

Paper or cloth intended to be used in the manufacture of cartridges, or for other purposes, is rendered less pervious to air and liquids by applying to its surface paraffin in a solid state or dissolved in the usual solvents. The paraffin may be melted and distributed evenly over the surface by means of a hot iron or heated rollers, or may be applied in a state of solution.

[Printed 4d. No Drawings.]

A.D. 1862, January 9.—N^o 68.

THOMPSON, BENJAMIN.—(*A communication from Edward Heaton.*)—"Improvements in ordnance and fire-arms, and in "projectiles to be used therewith."

Ribs or guide ways are formed in or let into the bore of the gun, to act instead of rifling grooves; they may be made of steel. An egg-shaped projectile is employed. The exploding chamber is "contracted at the mouth," and the projectile, when of iron, is turned smoothly to fit the mouth of the chamber.

[Printed, 2s. Drawings.]

A.D. 1862, January 13.—N^o 89.

GILBERT, THOMAS, GILBERT, CHARLES, and HADDON, THOMAS.—"An improvement or improvements in the manufacture of swivels for guns, and in machinery to be employed in "the said manufacture."

Swivels for guns are made from a rod of iron, "of a diameter "somewhat greater than the body of the finished swivel." By the process of "upsetting," a portion of the metal at each end of the rod is compressed in the direction of its length, and knobs are formed. The roughly formed blank is then finished in suitable dies, which give it the required shape.

[Printed, 8d. Drawing.]

A.D. 1862, January 13.—N^o 98.

TREEBY, THOMAS WRIGHT GARDNER.—(*Provisional protection only.*)—"An improved method of, and apparatus for producing, rifled cannon and fire-arms."

The gun is to be "cast on a hollow tube of the same twist and "form as the rifling may be required." Water is sent through the tube, "so that the rifling may be perfect." The cannon are "annealed in the usual way."

[Printed, 4d. No Drawings.]

A.D. 1862, January 14.—N^o 102.

HUGHES, EBENEZER WILLIAM.—"Improvements in malleable "cylinders and tubes used in engineering and architectural "structures."

Plates of wrought or malleable iron, having projecting flanges, are bolted together to form a tube. The plates are fastened in such a manner that "the outer or butting faces of the inclined flanges of the plates used," may be radial with the centre of the tube.

[Printed, 8d. Drawing.]

A.D. 1862, January 14.—N° 107.

MARSH, SAMUEL WILMER—"Improvements in breech-loading fire-arms."

The breech of the gun is closed by a hinged breech piece, and is so constructed that it "can be used either with or without a needle, and with or without fixed ammunition;" it can be converted at pleasure into a muzzle-loading arm. Various forms of plunger are made to work in the rear end of the barrel, and the escape of the gases of explosion is prevented by means of "a metallic expanding ring or gas-check." A metallic cartridge case may be used, an orifice being made in its rear, to allow a needle to penetrate and ignite "a detonating wafer," which is placed over the orifice inside the cartridge case. When ordinary cartridges are fired they are ignited by a cap, placed on a cone and struck by a hammer in the ordinary way.

[Printed, 1s. 8d. Drawings.]

A.D. 1862, January 14.—N° 110

HARRIS, JOSIAH. — (*Provisional protection only.*) — "An improved semaphore target marker."

In connection with the target a dial, "with an indicator hand worked by a winch handle operated upon by a marker," is to be used. A vane and cardinal points with signal flags can be used with the dial.

[Printed, 4d. No Drawings.]

A.D. 1862, January 18.—N° 132.

NEWTON, THOMAS. — "Improvements in sights for rifles."

The foresight is made moveable; it is attached to a "sliding plate working on a surface, or in a V groove forming part of a hoop or collar that is fitted on the muzzle of the gun." A

traversing motion is given the sight by means of a screw or rack movement.

The back sight is made to slide upon a hinged frame or leaf, marked with a scale, and moved by means of a rack and pinion, working on each side of the frame. The opening below the sight is closed by a series of plates. The back sight may be made moveable by attaching it by means of springs, or a pin with a milled head.

[Printed, 8d. Drawing.]

A.D. 1862, January 18.—N^o 138. (* *)

WINANS, WILLIAM LOUIS.—“Improvements in the manner of mounting, and apparatus for manœuvring, cannon or ordnance on ships or vessels of war and floating batteries.”

The principle improvements consist in “raising the cannon from a place of security below the upper deck, or from behind the bulwarks of a vessel of war or floating battery, just before firing it, to such a height as may be necessary in order to give it the proper direction, and to clear the decks and waterways or bulwarks of the vessel or floating battery, and so soon as it shall be discharged by lowering it to its place of security below deck or behind bulwarks, as the case may be, to be reloaded and prepared for refiring.”

“A gun with its carriages and platform may be raised either by steam power applied direct or, by steam or other motive power applied through the intervention of hydraulic pressure, or by steam or other power applied by means of gearing, or by means of a combination of screws or pullies, and chains or ropes or other equivalent mechanical contrivances. The gun can also be lowered by means of similar mechanism; but the arrangement I prefer to employ for this purpose consists principally of a steam cylinder, in which works a piston, which is suitably connected to the under side of the platform which supports the gun with its appurtenances, and which is raised, together with its load upon the admission of steam to the cylinder. The gun and its platform may, when desired, be lowered by opening a cock and allowing the steam to escape from the cylinder. It is necessary to make provision for supporting the gun and its appurtenances when raised to the required altitude, and for counteracting the lateral and vertical recoil during the firing.

" This may be done in several ways, but I prefer the under-mentioned, because it is easily managed and not liable to become deranged.

" I cause the platform to be guided during its elevation by guides sufficiently strong to resist the lateral recoil of the guns during the firing; and in order to support the gun when at its proper elevation, sufficiently to resist the vertical recoil, there are many ways that may be adopted, amongst which sliding bolts, ratchets, and palls, or their equivalents, may be employed in connection with substantial stanchions, or other means of support; but, by preference, I make use of one or more columns of water or other fluid. On the under side of the platform I place usually two cylinders, in which work pistons or plungers, which are attached to the platform. These cylinders are connected with a tank containing water or other fluid, and are provided with valves, which admit the fluid below the plungers, as the latter are made to rise by the uplifting of the platform to which they are attached. The valves will, of course, close when the gun is in position for firing, or immediately the upward motion is arrested; the platform with the gun-carriage, and its appurtenances, will thus rest on two columns of water or other fluid. By opening cocks in the lower ends of the water or fluid cylinders, the water or other fluid will be allowed to flow back into the tanks as gradually as may be desired, and the platform with the gun and appurtenances thereon will descend by gravity to the lower position ready for reloading. It will be convenient to make the lower end of the pistons or plungers of the water or fluid cylinders concave or hollow, so that they may contain a body of air which will serve as a cushion to diminish the shock." Sliding doors or covers of iron or other suitable materials are provided for closing the cannon hatchways, and these covers may be worked by the agency of steam.

" By this system or improvement one gun or cannon may be raised and discharged whilst others immediately in the rear or advance of it are being loaded, consequently most, if not all, of the cannon from different sides and parts of a vessel of war or floating-battery may be brought to bear in any given direction without the interference of one with another. Hence several pieces of cannon may be placed one immediately behind another on a given front, and all fired in the same direction, thus enabling a

“greatly increased number of cannon to be brought to bear from a single tier on a vessel or battery in any given direction.”

[Printed, 1s. 6d. Drawings.]

A.D. 1862, January 18.—N° 139.

ROBERTS, THOMAS, and DALE, JOHN.—“Improvements in the manufacture of gunpowder.”

Nitrate of soda is used wholly or partially in the place of nitrate of potash in the manufacture of gunpowder. A proportion of the anhydrous sulphate of soda, not exceeding 18 per cent. of the nitrate of soda, is used therewith. It is obtained by heating crystallised sulphate of soda in a stove, so as to drive off all the moisture. Instead of anhydrous sulphate of soda anhydrous sulphate of magnesia may be used.

[Printed, 4d. No Drawings.]

A.D. 1862, January 20.—N° 149.

DOREMUS, ROBERT OGDEN, and BUDD, BERN LUM.—“Improvements in making cartridges.”

Ordinary gunpowder is compressed into a cake in a suitable mould, so as to form a solid charge. It is not found necessary to moisten the powder with any liquid.

In forming a solid charge, say for a six-pounder gun, 1½ lbs. of powder are placed in a strong cylindrical mould, and pressed with a pressure of about 15 tons. If it be desired to have a charge of powder that will give out its force gradually, a third of the charge may be first put in, and pressed with a pressure of, say, 25 tons, then a second third part is put in, and pressed with 20 tons, and a third with 15 tons. The powder most pressed will burn the slowest, the other strata will burn with proportionally increased rapidity.

If required the solid charge may be pressed with the projectile, so as to be made to adhere to it. The charge may be made waterproof by coating it with collodion, shellac, or other solutions.

[Printed, 4d. No Drawings.]

A.D. 1862, January 24.—N° 183.

CORNFORTH, JOHN, and SMITH, BENJAMIN.—“New or improved machinery for boring or drilling gun barrels and tubes,

"and other articles having a cylindrical or prismatic figure, which
"said machinery may also be applied to other like purposes."

"Solid cylindrical or tapering bars of steel" are bored or drilled. Three machines are employed, the first in its construction "resembles generally a double lathe, or a lathe with two parallel head stocks." The bars intended to be bored are made conical at their ends, and are caused to revolve in conical chucks. The borers or drills are attached to rests, which are made to advance by means of a screw motion. A supply of soda, or soap and water, is constantly delivered into the bored bar by means of a small tube leading from a cistern.

In the second machine the steel bar is fixed horizontally, and the drills are made to rotate.

In the third machine two bars, intended to be bored or drilled, are placed in a vertical machine. Rotatory motion is given to the bars, and at the same time they are bored or drilled by two vertical drills rotating in a direction opposed to that of the bars.

[Printed, 1s. 6d. Drawings.]

A.D. 1862, January 24.—N° 187.

GIRDLESTONE, JOHN WARD.—(*Provisional protection only.*) — "Improvements in projectiles for fire-arms."

A jacket or sabot of wood, papier maché, or other suitable material is to be attached to the rear end of the projectile. The force of the explosion expands the sabot into the rifling grooves, and gives rotation on the projectile issuing from the gun; the sabot may be made to detach itself. Annular recesses may be made in the projectile to receive lubricating matter.

[Printed, 4d. No Drawings.]

A.D. 1862, January 25.—N° 192.

BAKER, WHITMORE.—(*Provisional protection only.*) — "Improvements in fire-arms, adapted to prevent their accidental discharge."

The action of the hammer is to be held by means of a stop or catch, which is released by means of a rod projecting from the butt-end of the stock. When the piece is at the shoulder the pressure of the marksman presses in the rod, releases the stop or catch, and allows the hammer to fall.

[Printed, 4d. No Drawings.]

A.D. 1862, January 28.—N° 221.

CULLING, CHARLES.—(*Provisional protection only.*)—"Im-
"provements in fire-arms."

A safety catch is to be applied to the lock. It is acted upon by means of a projection fixed behind the trigger guard, and released by the pressure of the hand; or a rod projecting from the butt-end of the gun may be made to release the catch by the pressure of the shoulder.

[Printed 4d. No Drawings.]

A.D. 1862, January 31.—N° 256.

BAGGETT, FRANCIS, and SANGER, JOHN.—(*Provisional protection only.*)—"An improvement or improvements in breech-load-
"ing small-arms."

The rear end of the barrel is to be prolonged, and an opening made in its upper part, to allow the cartridge to be inserted. The breech is closed by means of a sliding plug, which is moved by means of a lever handle. The plug is held in its place by a pin or bolt on which it turns; part of the circumference of the pin is flat, and part is cylindrical. When the pin is turned by a lever arm the cylindrical portion is brought outwards, and engages "with a depression in the solid breech closing the prolonged end of the barrel."

[Printed, 4d. No Drawings.]

A.D. 1862, February 3.—N° 284.

LANCASTER, CHARLES WILLIAM.—"Improvements in
"strengthening cast-iron ordnance."

The "rear end of the gun, including the whole of the cascable," is removed "before or after the gun has been strengthened with
"wrought metal in the form of a hoop or hoops, jacket or jackets,
"or both hoops and jackets." A screw is cut upon the jacket or hoop, and "a wrought iron or steel breech-end or cascable" is screwed thereon, "so as to close the rear end of the gun." The wrought-iron hoop or jacket which is placed on the rear end of the cast-iron gun "extends forward somewhat beyond the trunnions," and is prolonged to the rear "beyond the point at which the
"cascable has been removed." A screw thread is cut in it in

which the wrought-iron or steel breech is screwed. Any required number of additional hoops may be placed upon the inner hoop or jacket.

[Printed, 6d. Drawing.]

A.D. 1862, February 4.—N° 289.

MEEKINS, THOMAS MOSSOM.—“The production of a projectile and explosive force to be used in instruments of war; for an electric gas gun and electric gas shell; for a method of using the recoil of weapons; for the purpose of increasing the pressure of elastic fluids; for the production of a projectile force; for a method of rapidly loading weapons at the breech; and of a motive force to be used in an electric gas engine or other engines.”

Oxygen and hydrogen gases are evolved in a strong vessel which is connected with the barrel of a gun. The gases are evolved by voltaic or other electricity. When sufficient pressure has been obtained by the gases evolved, a communication is opened between the vessel and the barrel of the piece, which is loaded with a projectile, and the pressure of the gases discharges and propels the projectile.

[Printed, 4d. No Drawings.]

A.D. 1862, February 5.—N° 305.

HARRISON, EDWARD.—(*Provisional protection only.*)—“A certain compound or certain compounds to be used as a substitute for gunpowder.”

An explosive compound is proposed to be made by mixing the following ingredients:—

Chlorate of soda or potash	-	-	12	parts.
Nitrate	-	-	6	”
Starch	-	-	2	”
Ferrocyanide of potassium	-	-	4	”
Charcoal	-	-	1	”

[Printed, 4d. No Drawings.]

A.D. 1862, February 5.—N° 309.

NEWTON, ALFRED VINCENT.—(*A communication from Caleb Hannum Bradley and Gideon Miles.*)—“An improvement in fire-arms.”

The end of the barrel of the piece is provided "with a cutter or a notched, toothed, or otherwise roughened edge." The cartridges are pressed upon the cutter or roughened edge, and are thereby cut or broken open.

[Printed, 8d. Drawing.]

A.D. 1862, February 6.—N° 320.

TONKIN, JOHN.—"Improvements in the manufacture of gun-powder."

The following ingredients are first mixed together :—Saltpetre or nitrate of soda, 56 lbs. ; charcoal, 26 lbs. ; and sulphur, 15 lbs. To this mixture is added a pulp formed of vegetable fibre, treated with sulphuric and nitric acids in the ordinary way, so as to form gun cotton. The cotton fibre, after being treated with the acids and washed, is converted into "pulp in the same manner as is practised by paper makers." With about 3 lbs. of this pulp the mixture of saltpetre, charcoal, and sulphur is combined to form a paste, which is well mixed, and then granulated to form grains of powder ; in some cases the vegetable fibre is employed in its natural state, without its being converted into gun cotton.

[Printed, 10d. Drawing.]

A.D. 1862, February 11.—N° 351.

FYFE, THOMAS.—"Improvements in knapsacks, and in apparatus for supporting them or other similar burdens upon the shoulders."

The knapsack is supported by means of two stiff horns, which are attached, by sliding them into sockets, to the upper part of the knapsack. The flat parts of the horns rest on the shoulders, and they are adjusted and fixed by pins in their sockets to suit the wearer. Suitable straps are attached to the horns and the bottom of the knapsack to hold it in its place.

[Printed, 4d. No Drawings.]

A.D. 1862, February 11.—N° 362.

BOLTON, FRANCIS JOHN.—"Improvements in rifle and gun stopper and oil bottles."

The body of the gun stopper is made hollow, so that if required

it can be used as a receptacle for oil, and for a pricker or other instrument.

The body of the stopper is covered with an "elastic absorbent substance or fabric, which will hold a small quantity of oil." The elastic covering is made slightly larger than the bore of the barrel, so that it will fit with requisite tightness in the rifle grooves. The elastic covering may be made of woolen or worsted felt, or of cloth. It may be made in the form of a tube with ribbed surfaces.

[Printed, 6d. Drawing.]

A.D. 1862, February 12.—N° 374.

HORSLEY, THOMAS.—"Improvements in breech-loading fire-arms."

The barrels are turned down or tilted to enable the cartridge to be inserted in the breech end. In order to lock the barrels firmly in their place when their breech is closed, a bolt or catch urged by a coiled spring is made to engage in a recess, formed in a lump or projection attached below the breech end of the barrels. The bolt or catch is connected with a lever, which is made to act by means of a button or stud projecting inwards from the front of the trigger guard. By pressing the thumb on the head of the button or stud the catch is disengaged and the barrels are released. The arrangement may be applied to single-barrel guns.

[Printed, 10d. Drawing.]

A.D. 1862, February 13.—N° 375.

NEWTON, WILLIAM EDWARD.—(*A communication from James Woodbury and Solomon Gray.*)—(*Provisional protection only.*)—"Improvements in projectiles."

Antifriction rollers or wheels are to be attached to the projectile "at an angle to the line of motion of the same."

The diagonal wheels acting upon the interior surface of the barrel will give rotation to the projectile, without the necessity of employing rifle grooves. Packing is to be attached to the rear of the projectile to fill the bore.

[Printed, 4d. No Drawings.]

A.D. 1862, February 13.—N° 394.

JANSEN, ADOLPHUS.—(*Provisional protection only.*)—"A new ball for fire-arms."

The ball is to be "made of lead, and is of a cylindro-conical form." Two or more "deep grooves are cut round the projectile," and when the charge is exploded, the lead is driven up, and the projectile is expanded to fill the bore.

[Printed, 4d. No Drawings.]

A.D. 1862, February 15.—N° 409.

HORSLEY, THOMAS.—(*Provisional protection only.*)—"Improvements in apparatus for turning and closing the cartridges of breech-loading fire-arms."

Self-acting apparatus for ramming down and turning the edge of breech-loading cartridges is proposed to be employed. The cartridge, with its charge of powder, is placed in a cup, to which standards are attached supporting a lever presser. The shot and wads are introduced into the cartridge, and rammed down by the lever. The cartridge is then pushed upwards by a lever working at the bottom of the lower cup, and is pressed against an upper inverted cup, which is turned by a handle, and so turns over the edge of the cartridge.

[Printed, 4d. No Drawings.]

A.D. 1862, February 18.—N° 432.

HENRY, MICHAEL.—(*A communication from Jules Lemoine.*)—"Improvements in cartridges."

A tube or case of metal or other impervious material is to be employed. A collar is attached to the tube "to prevent its slipping too far down the barrel of the arm." The tube may be coated "inside and outside with fluid, semi-fluid, or leaf varnish or collodion." When a recess is made in the projectile gun cotton may be placed in it.

[Printed, 4d. No Drawings.]

A.D. 1862, February 20.—N° 454.

PRITCHETT, ROBERT TAYLOR.—(*Provisional protection only.*)—"Improvements in targets or butts."

It is proposed to face targets or butts with lead in order that eaten bullets, when fired at such targets, may stick in the lead and be recovered, and so prevent waste of lead. In some

cases the backing of the target may be dispensed with, and blocks or plates of lead may be fitted in frames.

[Printed, 4d. No Drawings.]

A.D. 1862, February 24.—N° 488.

HADDAN, JOHN COOPE.—“Improvements in small arms and “in artillery, and in projectiles for artillery.”

An adjustable stock is used for guns. The stock has a moveable part, which, by means of “a hinge or pin or joint placed “longitudinally or fitted upon dowels or pins,” may be adjusted to suit the marksman.

In making ordnance an inner tube of metal of great strength “such as ‘Mushet’s metal’ or steel” is strengthened with a series of hoops, which are screwed or fitted together. The rear hoop may be attached to or made to form the breech piece.

Projectiles are made with swells of hard metal at their rear ends, which may be used with swells of soft metal at the front ends; a belt of lead may be also used at the rear ends. Shells are charged with cast-iron pieces made with thick parts and thin parts so shaped that they will pack closely and be readily broken up. Spherical shells are made with separate pieces packed together.

Percussion fuses are made with the tube which contains the striker of a “conical or enlarging form” to allow a ready passage for the striker.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, February 25.—N° 507.

MINASI, CARLO.—(*Provisional protection only.*)—“Improvements in cartridges and in apparatus for facilitating the proper “aiming with fire-arms.”

The cases or coverings of cartridges are to be “partially cut “or stamped,” so that they will readily tear or open in the required parts. The stock of a rifle may be made with a hinged adjustable part, which may be adjusted to suit the marksman.

[Printed, 4d. No Drawings.]

A.D. 1862, February 25.—N° 510.

WHITWORTH, JOSEPH.—“Improvements in manufacturing “and preparing projectiles, and in apparatus to be used for those “purposes.”

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Projectiles, when turned in a lathe to give them the required regularity of shape, are held in a chuck in such a manner that the fore and rear parts may be turned by simultaneous or consecutive operations by moving the tools up as required.

Lubricating substance is applied to projectiles in spiral strips, corresponding to the rifle grooves. The recess formed in the rear of the projectile is filled with "resilient materials," such as chopped blotting paper reduced to pulp, or finely curled hair.

[Printed, 10d. Drawings.]

A.D. 1862, February 26.—N^o 529.

SAVAGE, WILLIAM PEACOCK.—"Improvements in fire-arms."

A safety catch or stud pin is fixed "in front of the half bent of the tumbler (of the lock), in such a position that, were the tumbler released by the sear, it would be immediately caught by the said stud pin." The stud pin is actuated by a lever fixed behind the trigger guard. When the lever is pressed by the hand while the gun is held to the shoulder, it moves the safety stud pin out of the way, and allows the hammer to fall. A plate may be fitted on the loop of the trigger guard, and act as a stop to the action of the trigger until it is pushed out of the way.

[Printed, 10d. Drawings.]

A.D. 1862, March 3.—N^o 572.

SHAW, ROBERT.—(*Provisional protection only*).—"An improvement in fire-arms by a more convenient method of placing the ramrod in position."

The ramrod is to be attached to the stock by means of two sockets and a clip in the middle of the barrel. The heavy end of the ramrod is held at the breech end of the barrel in a socket in which is a spring. The ramrod is released by pressing it in the breech socket, and withdrawing its other end from the muzzle socket.

[Printed, 4d. No Drawings.]

A.D. 1862, March 4.—N^o 589.

SMITH, JOHN THOMAS.—(*Provisional protection only*).—"An improved sight for fire-arms, applicable also as an apparatus for measuring angles."

The sight is "composed of a tube in which two pistons of equal refracting power, independent of each other, are fitted in such a manner that they may be made to revolve through equal angles in opposite directions."

[Printed, 4d. No Drawings.]

A.D. 1862, March 5.—N° 595.

SIDEBOTTOM, JOHN.—"Improvements in fire-arms and ordnance, and in projectiles."

The improvements are based upon those described in the Specification of former Letters Patent, dated July 24, 1861. When the recoil of the gun is made to act upon a spiral groove and give rotation to the piece, a break "in the form of a wedge" is applied to the bearing in which the barrel is supported. To prevent windage an annular piece of metal is fitted loosely on the conical rear part of the projectile, so that it may be loaded easily. When the charge is fired the annular piece is forced forward on the projectile, and completely fills the barrel of the piece.

[Printed, 8d. Drawing.]

A.D. 1862, March 8.—N° 626.

DEANE, JOHN.—"Improvements in revolving fire-arms."

The revolving piece is pierced with chambers bored completely through, and charged from behind with suitable cartridges. Behind the revolving chamber piece is a shield or breech piece, having an aperture through which each chamber is charged. The chamber is then turned and another is presented. When all the chambers are charged their rear ends are closed by the solid parts of the shield or breech piece against which they abut. When the special cartridges suitable for the breech-loading chambers may be exhausted, the rotating breech-loading piece may be removed, and one of the ordinary construction be substituted.

[Printed, 6d. Drawing.]

A.D. 1862, March 10.—N° 637.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Salloum Dahdah.*)—(*Provisional protection only.*)—"Certain improvements in breech-loading fire-arms."

A revolving chamber is to be attached to or connected with the breech; cartridges are contained in a spirally formed channel or canal made in the chamber. By the act of cocking one of the cartridges is forced, by means of a coiled spring, into the charge chamber of the barrel, and its place in the cartridge chamber is supplied by the next cartridge. The piece is thereby made self-loading.

[Printed, 8z. Drawing.]

A.D. 1862, March 10.—N° 642.

SPENCE, WILLIAM.—(*A communication from Ira Wells Shaler.*)—“Improvements in projectiles.”

The projectile is made in two or more parts, or two or more projectiles are combined, so that they are fired together from the barrel as one projectile. The front part of one projectile is made to fit or project into the recessed rear of the other placed before it. The projectiles on being fired at a mark will diverge from one another, so that the chances of hitting are increased with the number of projectiles used.

[Printed, 6z. Drawing.]

A.D. 1862, March 12.—N° 679.

NEWTON, WILLIAM EDWARD.—(*A communication from Elam Potter and Julius Pomeroy.*)—(*Provisional protection only.*)—“Improvements in the manufacture of cartridges.”

* The powder and bullet are to be compressed in a suitable mould, so as to make the grains of powder cake together and adhere to the bullet. A layer of collodion is then attached in a strip to junction between the powder and the bullet. The charge is then dipped in a collodion solution, and is covered with that material instead of paper.

[Printed, 4z. No Drawings.]

A.D. 1862, March 17.—N° 743.

WALLER, THOMAS.—(*A communication from Christopher Tyler, Stephen Wood, Egerton Marcy, and John Wilkinson.*)—“Improvements in breech-loading fire-arms.”

The breech is closed by a hinged breech-piece, which turns on an axis parallel with that of the bore of the piece. The cartridge has a metallic case, and the fulminating composition is contained in a rim formed on the rear end of the cartridge. The rear end of the barrel has a projection at the rear, and is bevilled or notched, so that the rim of the cartridge may be seized with the fingers. A safety bolt is used, so as to prevent the hammer from discharging the piece, except when the bolt is withdrawn and in its place.

[Printed, 1s. 8d. Drawings.]

A.D. 1862, March 21.—N° 789.

BROWNLOW, HUGH MATHEW.—"Improvements in fire-arms
"and in cartridges."

The barrel of the breech-loading fire-arm is made "with a longitudinal aperture" at its rear end; at the back of the aperture is "a transverse cylindrical hole for the reception of a curvilinear wedge." The aperture is "filled and covered by a solid plunger, the face of which bears against the barrel." The rear end of the plunger is "formed with a hollow curve to receive the curvilinear surface of the wedge." On the wedge is a projection, by means of which it is worked by a handle by a crank and lever motion. Wide rifling grooves are formed in the barrel having "peculiar curves," which "converge towards a common centre." The back sight has two moveable points or pins capable of lateral adjustment, in addition to the ordinary notch. The cartridge employed has a flange projecting from its rear "with a tail carried from the flange," in which the percussion cap is inserted.

[Printed, 10d. Drawing.]

A.D. 1862, March 25.—N° 821.

BEAUMONT, WALTER, and EDGE, JOHN WILLIAM.—"Im-
"provements in sights for rifles."

In moving the sliding bar of the back sight two screws are employed, "one on each side of the back of the framework." On the top of each screw is a small toothed wheel; these wheels are turned by an additional or intermediate wheel. The screws

work in the sliding bar and raise or lower it, as the additional wheel is turned. The plate of the sliding bar may be made moveable, so that different V or other sights may be placed in it, according to the weather, or light, or wish of the marksman.

[Printed, 6d. Drawing.]

A.D. 1862, March 25.—N° 827.

CULLING, CHARLES. — (*Provisional protection only.*) — “Improvements in fire-arms.”

A safety catch is to be applied to the lock. The catch is to be released by means of a stud or plate which projects from the stock. When the cheek of the marksman is pressed against the stock the catch is released and the piece may be fired.

[Printed, 4d. No Drawings.]

A.D. 1862, March 26.—N° 840.

GRIFFITHS, ROBERT. — (*Provisional protection only.*) — “Improvements in weapons of warfare for naval purposes.”

Projecting punches or rams are proposed to be applied to war vessels; they are to be worked below the water line by steam or other power, so as to penetrate the hull of an enemy's vessel. Projectiles are to be made with the fore part to act as a punch, and at the base of the punch a space is left, which is to be filled with explosive material. When the projectile hits a vessel the fore part of it is to be driven into the part hit by the explosion of the bursting charge.

[Printed, 4d. No Drawings.]

A.D. 1862, March 27.—N° 841.

WINANS, WILLIAM LOUIS. — “A new or improved mode of mounting, and apparatus for manœuvring, ordnance in land fortifications.”

The guns are mounted with their carriages on platforms mounted on an under framework on which the platforms turn on pivots. A steam cylinder is placed below each platform and raises it to any required level, so that the gun may fire over a parapet in any required direction. Connected with the platform are cylinders which

are fed with water from a suitable tank. As the platform is raised the water flows into the cylinders and supports the platform and gun, until the latter is fired, when the water may be let out, and the gun immediately descends out of the reach of enemy's fire.

Bomb-proof coverings are placed over the guns, provided with hatchways through which the guns are raised. Several rows of guns may be arranged one behind the other to fire in succession, and then drop down to be reloaded.

[Printed, 1s. 6d. Drawings.]

A.D. 1862, March 27.—N° 852.

VERNEDE DE CORNEILLAN, JEANNE LOUISE HENRIETTE CLÉMENTINE, Comtesse de. — "Improvements in treating open cocoons of silkworms, and in converting the waste resulting therefrom into paper."

Silk cocoons are treated in alkali solutions and in baths charged with sulphuric acid or caustic soda. The waste is cut and carded like cotton waste, and is then bleached in "boiling alkaline and soapy lees, in oxygenated muriatic acid, or in sulphuric acid." The waste is then subjected to the vapour of sulphur for 12 to 15 hours, and when necessary, the operation is repeated. The result is a cotton suitable, among other purposes, for being made into gun cotton and paper for cartridges.

[Printed, 4d. No Drawings.]

A.D. 1862, March 29.—N° 872.

BOUCHER, JOHN. — "Improvements in rifled ordnance and fire-arms, and in the projectiles to be used therewith."

Rifle grooves are made very shallow and of a curved shape, the curve gradually merging into the cylinder of the bore. The grooves are shallower at the breech than at the muzzle, so that the "projectile expands gradually into the rifling as it proceeds towards the muzzle." Projectiles are made "polygonal or many sided, not so as to fit the grooves," but having the number of sides so "proportioned to the number of lands and grooves, that the projectile cannot be placed incorrectly in the barrel." The projectile "is kept fairly in its place, without undergoing too much friction in loading."

[Printed, 8d. Drawing.]

A.D. 1862, March 29.—N° 873.

PARFREY, YOUNGS.—“Improvements in breech-loading fire-arms.”

The barrel or barrels is or are made to slide upon a bar connected with the breech. The sliding motion is given by means of a handle working a pinion and a rack. The barrels are moved from the breech to receive the charge, and the breech is closed by moving back the barrel by the rack and pinion motion.

[Printed, 10d. Drawing.]

A.D. 1862, March 31.—N° 895.

LORD, WILLIAM BARRY, and GILBART, FREDERIC HUGHES.—(*Provisional protection only.*)—“Improvements in loading fire-arms.”

A charging cylinder is to be fitted to the ramrod; the powder charge is to be placed in the cylinder and then be pushed into the barrel. When the ramrod reaches the breech of the barrel a “mushroom valve” is made to open and allow the powder to escape from the cylinder. The piece is thereby loaded without any part of the powder being deposited on the inside of the barrel so as to cause fouling.

[Printed, 4d. No Drawings.]

A.D. 1862, March 31.—N° 898.

NIGHTINGALE, ROBERT.—(*Provisional protection only.*)—“Improvements in markers’ butts or mantelets.”

It is proposed to employ mantelets closed in on all sides, and to affix a camera to the top of the mantelet, so as to throw an image of the target on a ruled sheet of paper. The marker inside the mantelet can see the hit on the target, and by means of flags or arms, fixed outside and worked from the inside, he can signal the position of the hit.

[Printed, 4d. No Drawings.]

A.D. 1862, April 4.—N° 968.

NEWTON, WILLIAM EDWARD.—(*A communication from Henry Tatem Potter.*)—(*Provisional protection only.*)—“An improvement in projectiles for ordnance.”

In order to make the projectile suitable for penetrating armour-plated vessels under water, it is to be made hollow, with the fore part "hollowed out internally of a taper form." The projectile is to be fired with a sabot.

[Printed, 4d. No Drawings.]

A.D. 1862, April 4.—N° 971.

WALKER, MOWBRAY.—(*Provisional protection only.*)—"Improvements in breech-loading rifles and other fire-arms, and in ordnance."

The breech end of the barrel is to be closed by a plug "capable of being turned or in part turned on a centre out of the same line with the breech end of the barrel to load the rifle."

The plug may be worked by a lever handle. The nipple is to be fixed in the barrel in the ordinary way.

[Printed, 4d. No Drawings.]

A.D. 1862, April 7.—N° 983.

HARRIS, ALFRED.—"An improvement or improvements in the manufacture of gun barrels."

Barrels are made by "welding together a series of bars," each being of such a sectional shape that the bars when put together will form a tube. The bars are "arranged and supported longitudinally, or side by side, upon a tube or solid rod or core."

Two or more cylinders made up of the said bars may be "arranged longitudinally and concentrically upon a tube or solid rod or core." The welding operation may be performed by rolling, drawing, or forging.

[Printed, 8d. Drawing.]

A.D. 1862, April 10.—N° 1024.

HOUGHTON, JOHN.—"An improved haversack."

The haversack is made with two flaps, having pockets so arranged that when suspended in the middle "one flap may hang over and cover the other flap."

In the middle of the haversack is a pocket into which is fitted a metal or other case, and the flaps are made to hang on each side of the case. The haversack is suspended by straps in the usual way.

[Printed, 10d. Drawing.]

A.D. 1862, April 11.—N° 1049.

CLARK, WILLIAM.—(*A communication from Adolphe Blanc and Jean Frédéric Auguste Marty.*)—"Improvements in the manufacture of leathern accoutrements."

The pieces of leather required to be fastened together are joined by means of screws or rivets of metal instead of being sewn. The articles are held in a suitable holder, and the screws are inserted by a machine such as is "ordinarily used for screwing the parts of boots and shoes together."

[Printed, *8d.* Drawing.]

A.D. 1862, April 11.—N° 1051.

JOHNSON, JOHN HENRY.—(*A communication from abroad by the Society Cordier and Company.*)—"Improvements in fire-arms."

The improvements relate "more particularly to that class of fire-arms wherein the distance between the sights is considerably longer than the length of the barrel." The tumbler may be removed "without necessitating the removal at the same time of the woodwork of the stock," by means of two projecting studs "formed on the tumbler or trigger frame." A bent spring is applied "below the bottom of the elevation sight, both ends of the spring bearing upon the central plate or tail of the barrel." Instead of the central plates or tail of the barrel usually employed in this class of fire-arms, two straps forming continuations of the breech are used, one lying on the upper the other on the under side of the stock. The percussion rod is driven forward by a cock actuated and placed in the ordinary manner.

[Printed *8d.* Drawing.]

A.D. 1862, April 15.—N° 1081.

LE MAT, FRANÇOIS ALEXANDRE, and GIRARD, CHARLES FREDERIC.—"Improvements in the construction of revolving and repeating fire-arms, part of which invention is also applicable to other arms."

The lock of the fire-arm has a hammer whose body "is centred upon a pin held in the stock; it has a circular aperture made at

"the back just above the heel, and to this heel a link is pinned, which receives the fore end of the main spring, which is a simple straight blade of steel, the rear end of which is held in a jaw," or otherwise attached to the stock.

The chamber of a revolver is turned by means of the hammer, which acts through a link upon a ratchet motion. A locking bolt, actuated by a spiral spring, holds the barrel when in the required position.

[Printed, 10d. Drawing.]

A.D. 1862, April 15.—N° 1082.

ROCHE, RICHARD.—(*Provisional protection only.*)—"An improvement in gun carriages."

The gun is proposed to be fitted "in a block which is of such a length as to receive not only the trunnions but portions of the gun, both in front and in rear of the trunnions." The block is to be mounted on a bed, and be worked by a worm and worm wheel.

[Printed, 4d. No Drawings.]

A.D. 1862, April 15.—N° 1084.

NEWTON, ALFRED VINCENT.—(*A communication from Frederic Wynants and Prosper Esselens.*)—"Improvements in the manufacture of blasting powder."

Nitrate of baryta is used instead of nitrate of potash in making an explosive powder. Nitrate of baryta, 77 parts; charcoal, 21 parts; and saltpetre, 2 parts, produce good results. No sulphur is introduced into the mixture.

Nitrate of strontian or nitrate of lead may be employed.

[Printed, 4d. No Drawings.]

A.D. 1862, April 15.—N° 1090.

GRAY, THOMAS WOOD.—(*A communication from Julian John Revy.*)—"Improvements in the manufacture of explosive compounds."

Gun cotton is made by spinning lightly twisted yarns of cotton and washing and drying the yarns, and then immersing them in a mixture of monohydrated nitric acid, sp. gravity not under 1.52, and monohydrated sulphuric acid, sp. gravity not under

184. The acids are mixed in a suitable vessel, and stirred with a perforated agitator. The yarn, after being immersed for about 48 hours in the mixture, is dried in a centrifugal drying machine, and then thoroughly washed in water. The yarn is then again dried, and boiled in a weak solution of water glass for about $1\frac{1}{2}$ hours; it is then squeezed, again washed, and, finally, well dried. The yarn may be wound in the form suitable for cartridges, or it may be spun into a rope, or be woven into cloth.

[Printed, 4d. No Drawings.]

A.D. 1862, April 16.—N° 1094.

BARRETT, STEPHEN.—(*Provisional protection only.*)—"Improvements in projectiles."

The projectile is to be made of cast steel, its end being made "somewhat smaller than the bore of the cannon, to allow for the coating, and it decreases in size towards its rear end." A coating of lead or other substance is applied to the projectile. Part of the coating may be made of inflammable materials. The projectile may be made hollow, and have a plug projecting from its front.

[Printed, 6d. Drawing.]

A.D. 1862, April 16.—N° 1095. (* *)

GISBORNE, FREDERIC NEWTON.—(*Provisional protection only.*)—"The title of this invention is 'Improvements in the construction of electric targets for rifle and gun practice.'"

The inventor states:—"In lieu of the chemical decomposition recorder, described in my Patent of the sixteenth day of May, one thousand eight hundred and sixty-one, N° 1246, I sometimes use a series of electro-magnets for the purpose of printing or puncturing the paper diagram, and in order to do so effectually I charge the style points with ink almost simultaneously, and by another arrangement I cause the paper to change its position over the said styles, and thereby record correctly several shots on the same segment. I also use a disc attached to my target, hammers, or balls, which moves excentrically when in motion, and thereby imparts a rubbing electric contact to a spring suitably placed near it. I also combine permanent and electro-magnets to arrest and release at pleasure the balls or

"hammers when they recoil. I also impart motion to a slide or shutter in front of the diagram, by attaching thereto an iron axis, so placed that when pivoted excentrically it will fly up or back, according to the position of the said axis to an electro-magnet. I also employ the alternate action of electro-magnets between the target and firing stand, which in effect are almost synchronous, and in accordance with the meaning of those described in the Specification of my said Patent."

[Printed, 4d. No Drawings.]

A.D. 1862, April 16.—No 1098.

LOCK, WALTER FERGUSON.—"An elongated projectile to be shot from smooth-bored ordnance, and which shall retain during its flight the longer axis in the direction of its line of flight, similarly to elongated projectiles propelled from rifled ordnance."

The projectile is made with a head of a conical or other suitable shape, and has a cylindrical stem. Blades or wings are inserted in longitudinal clefts formed in the cylinder at intervals, and are held in their places by springs which are released when the projectile leaves the gun. The action of the wings keeps the projectile in proper position, with its point foremost, during flight.

[Printed, 4d. No Drawings.]

A.D. 1862, April 16.—No 1101.

MACKAY, JAMES.—"Certain improvements in projectiles for fire-arms."

The projectiles are "more especially applicable" to fire-arms with a smooth bore; they are made in the form of a hollow cylinder, "the end next to the powder being closed with a plate, which detaches itself upon leaving the barrel, the channel through the bolt being then left open for the passage of the current of air, which maintains the true position of the bolt as it progresses, thus ensuring the proper part of the bolt to strike the object." Shells may be made of this form "by placing the bursting charge in cavities formed around the central channel." Spiral grooves may be formed either in the interior channel or on the exterior surface of the projectile, to give rotation to it during its flight.

[Printed, 8d. Drawing.]

A.D. 1862, April 16.—N° 1102. (* *)

ROWAN, JOHN MARTIN.—(*Provisional protection only.*)—"Improvements in manufacturing articles of cast steel."

"This invention relates to means of obviating, preventing, or removing the 'honeycomb' or porous condition to which articles of cast steel, as hitherto manufactured, are found subject; and the invention consists in applying pressure, by means of hydraulic apparatus, for example, to the cast steel in the mould when in a fluid or nearly fluid condition, such pressure consolidating and greatly improving the cast steel, and also rendering it better suited for subsequent treatment by hammering or rolling. The term 'cast steel' is intended to include metal converted by the pneumatic process."

"In the case of an ingot or block designed for a gun, and cast on end, the pressure may be applied by means of a plunger or false bottom forced upwards from below."

[Printed, 4d. No Drawings.]

A.D. 1862, April 16.—N° 1108.

NEWTON, WILLIAM EDWARD.—(*A communication from David Tomlinson Yeakel.*)—"Improvements in the manufacture of cannon and other ordnance, and of solid and hollow cylinders for shafting and other purposes, of wrought iron or steel, or both combined."

Guns are made of "concentric welded folds" of iron or steel. A plate or sheet of iron or steel is rolled round "a central mandril of wrought iron, steel, or other metal," and heated to a welding heat, and "welded together as it is rolled up, or after it is rolled up."

In some cases more plates than one may be rolled up, and the welding be performed by rolling or hammering. Instead of rolling the sheet or sheets upon a mandril, they may be first rolled and then welded on a mandril. The mandril may be bored out or otherwise removed. In all cases the diameter of the mandril should be less than the bore of the gun is intended to be when it is completely bored.

[Printed, 6d. Drawing.]

A.D. 1862, April 19.—N° 1144.

BROWNE, BENJAMIN.—(*A communication from Felix Célestin Palis.*)—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The outside of the breech end of the barrel is to be enlarged, so as to form a chamber. "A long opening at the top" is left, into which a tubular charge chamber is to be fitted, a nipple being fixed upon it. The charge chamber is to be lifted out to receive the cartridge, and then replaced in the breech end of the barrel; it is locked by means of a spring bolt, and so is fastened in its place.

[Printed, 4d. No Drawings.]

A.D. 1862, April 19.—N° 1146.

ROSE, WILLIAM.—"Improvements in the manufacture of tubes, more especially applicable to the barrels of fire-arms and ordnance."

The barrels of fire-arms are made by taking "a strip, band, or skelp of iron, or steel, or both," and passing it through grooved rollers or dies to form a partial or completely formed tube, which is welded at the edges. The partial or completely formed tube is then cut into suitable lengths, round which bands or strips of iron or steel are coiled. The mass is then heated, and "jumped up" if necessary to close the coil, and then passed on "a roller mandril" through grooved rollers to weld and draw out the tube. For large ordnance a similar process of manufacture is adopted with larger masses and stronger machinery.

[Printed, 4d. No Drawings.]

A.D. 1862, April 21.—N° 1153.

MONCKTON, EDWARD HENRY CRADOCK.—"Improvements in the preparation of metal to be used in the construction of cannon, rifles, armour plates, and other objects used in naval or military warfare or otherwise."

Iron or steel is made from iron sands, or from iron sands mixed with Swedish iron. "In the construction of cannon the deposition of metals or their alloys" is made by the agency of

electricity upon coiled or other cores. The deposited metal fills up the interstices, and so produces a tubular or other form.

[Printed, 6d. No Drawings.]

A.D. 1862, April 24.—N° 1194.

BOND, JOHN.—“ Certain improvements in projectiles, which “ improvements are applicable to horns attached to vessels for “ war purposes.”

The projectile is made hollow, and in a recess in front of it is placed a charge of fulminating or other exploding powder. The “ body of metal round the recess” forms a punch. A plug may be fitted in the recess to cause the explosion of the charge. For smooth-bored guns projectiles having diagonal grooves on their surfaces are employed. A horn is attached by brackets to the ram of a ship, and an exploding charge is placed in a recess in the horn, which is discharged when the horn is driven against the side of another ship. A fresh horn with another charge is then attached to the brackets, and the ship is again ready for action.

[Printed, 8d. Drawing.]

A.D. 1862, April 25.—N° 1208.

RICHARDS, GEORGE.—“ Improvements in ordnance and the “ manner of loading such with the charges and projectiles suitable “ thereto.”

Instead of rifling grooves, “ projections or rails” are fitted in the interior of the gun; the projectile is made to rest upon the surfaces or edges of the projections, and a sabot is fixed behind it, upon which the gases of explosion act. Projectiles of smaller diameter than that of the bore of the gun may be fired.

Perforations are made in the breech of the gun, through which a rod or wire is passed. When the charge is inserted in the muzzle it is drawn to the breech end of the gun by means of the rod or wire, which is then detached. The cartridges may be made hollow, and the wire or rod when passed through them is fastened by a nut, or by means of a suitable slot and stud “ similar to a bayonet “ catch.”

[Printed, 8d. Drawing.]

A.D. 1862, April 30.—N° 1266.

MAHON, ARTHUR IRWIN.—(*Provisional protection only.*)—"Improvements in projectiles."

Rotation is proposed to be given to an elongated projectile, when fired from a smooth-bore gun, by causing the gases of explosion to act upon inclined surfaces formed on the surface of the projectile; or channels of a spiral or other form may be made in the projectile. A powder charge may be inserted in a recess formed in the rear end of the projectile.

[Printed, 4d. No Drawings.]

A.D. 1862, April 30.—N° 1272.

LEIGH, EVAN.—(*Provisional protection only.*)—"Improvements in the construction of ships and floating batteries, in mounting their guns, and in the application of steam power, parts of which improvements are also applicable to land batteries and forts."

Paddle-wheel propellers are to be made "with shrouds and buckets similar to a water wheel." The buckets are "air-tight, or nearly so;" when they enter the water the air is compressed, and when they leave the air "rushes out and pushes the water away from them, the recoil acting in the direction of propulsion." For floating batteries or ships a steam ram is to be used, the ram being connected with the piston of a steam engine. Guns are to be mounted so as to be balanced at the two ends of a lever which turns on a central pivot.

[Printed, 4d. No Drawings.]

A.D. 1862, April 30.—N° 1281.

NAPIER, JAMES MURDOCH.—"Improvements in machinery for manufacturing projectiles."

Improved self-acting machinery is employed for cutting off pieces of lead from a rod, and compressing it in dies to form a bullet. "A first or roughing die" is used to partially form the blank, by compressing the piece of lead cut from the rod, and forcing "through an aperture" all the surplus lead, so that the exact quantity required is passed into the finishing die. The tools for cutting off the lead, and carrying it to the roughing and the

finishing die, are fixed "upon the same slide, so that one cam and "connexions are sufficient." The punches for the two dies are placed "upon one slide," actuated "by a single crank and one "set of knuckle joints, so that both punches advance and retire "together, and the lead in both dies is compressed at the same "time." The length of lead cut off is regulated by means of "a divided ratchet wheel." Hydraulic apparatus is used to drive the machine, the valves being so arranged "that the opening "and closing valves are nearly balanced by the pressure of the "water."

[Printed, 10d. Drawing.]

A.D. 1862, May 1.—No 1290.

HOLMES, THOMAS.—(*Provisional protection only*).—"An improvement in the manufacture of military cartouches, port-monnaies, courier bags, letter bags, knapsacks, and other articles of a like nature."

A steel wire spring is to be inserted in the cartouch, knapsack, or other article, and so fixed that it will press upon and insure the "safety and compactness" of the articles carried.

[Printed, 4d. No Drawings.]

A.D. 1862, May 3.—No 1319.

MEROLLA, SALVATORE.—"Improvements in fire-arms."

A nipple cover is attached by a joint to the lock plate, in such a position that when the lock is at half-cock the cover may be placed over the nipple and protect it from wet and also prevent accidental discharge. When the hammer is pulled back to full cock it causes the nipple cover to be removed from the nipple, so that the piece is ready to be discharged.

[Printed, 8d. Drawing.]

A.D. 1862, May 5.—No 1331.

BRINDLEY, THOMAS FRANCIS RICHARD.—"Improvements in "travelling and other flasks, decanters, bottles, and other necked "vessels."

Stoppers for the mouths of powder flasks or other vessels are made by fitting on the neck of the vessel a hinged plate, to the

under side of which is attached a cone or half sphere, so as to fit closely the mouth of the flask. A spring of vulcanized india-rubber is attached beneath the hinge, and passing round it is attached at its upper end to the plate. "Upon the pivot of the hinge is also hinged a tongue of metal, which passes vertically from the hinge and then horizontally over the plate on which it rests." The part of the tongue, where it is hinged is provided with catches. When the tongue is raised the catches come in contact with the under side of the plate, which they raise, and so open the flask.

[Printed, 6d. Drawing.]

A.D. 1862, May 5.—N° 1335.

BURLEY, ROBERT.—"Improved arrangements for using ordnance under water and in part applicable otherwise."

The gun is made to discharge its shot under water; it may either be permanently fixed to the ship's side, or its muzzle may be pushed through a suitable water-tight opening. A perforated plug is fixed in front of the charge chamber to exclude the water while the piece is loaded through the breech. The breech may be closed by a perforated plug or by other suitable means.

[Printed, 8d. Drawing.]

A.D. 1862, May 7.—N° 1357.

JUDSON, WILLIAM.—(*Provisional protection refused.*)—"The use of caoutchouc or india-rubber for and its application to guns, mortars, or other fire-arms, to resist the force of the recoil and reaction in firing."

The nature of the invention was stated to "consist in the use of caoutchouc for and its application to guns and mortars" to resist recoil. It may be used as bearings for trunnions, or placed behind or under the breech of the gun or mortar. Cords or bands of caoutchouc may be used.

[Printed, 1s. Drawings.]

A.D. 1862, May 9.—N° 1393.

BLAND, JAMES FOX.—(*Provisional protection only.*)—"An improved method of and apparatus for signalling between targets and shooters."

It is proposed to employ an index or scale set in front and below the target, "the numbers thereon corresponding with lateral divisions on the target. An indicator, consisting of a rod carrying a disc, is to be used with numbers to correspond with vertical divisions on the target. A pit is formed in front of the target, and the indicator is fitted on a level with its base, the pit being roofed over to protect the marker.

[Printed, 4d. No Drawing.]

A.D. 1862, May 10.—N° 1402.

MILWARD, JOHN FREDERIC.—(*A communication from John Bisset.*)—"Improvements in breech-loading fire-arms."

Cartridges carrying their own ignition are inserted in the breech end of the barrel, which is bored entirely through from muzzle to breech. The breech is closed by a sliding piece, which is depressed by means of a lever forming the trigger guard. At the same time that the sliding breech piece is depressed, the lock and hammer are moved in a downward direction to allow the cartridge to be inserted. The cartridge when discharged is removed by means of a "sliding bolt or ejector" connected with the lever trigger guard, whose projection catches the flange of the base of the cartridge and pulls it out of the barrel.

[Printed, 1s. Drawings.]

A.D. 1862, May 10.—N° 1403.

CLARK, WILLIAM.—(*A communication from Jean Louis Abeilhau.*)—"The application of a vegetable fibre alone or in "combination with other matters in the manufacture of felted "and other fabrics; also a substitute for flock or powdered wool, "and as a material for padding or stuffing, and for other useful "purposes."

A felted material that may be used for the manufacture of "knee caps, blankets, shabracks, cavalry equipments, holsters, "knapsacks, scabbards," and for other purposes, is made from the fibrous down of the "typha plant," commonly known as reeds or bulrushes. The down is dried and beaten on screens or gratings like those used by wool beaters, and is cleansed and purified, and then felted with hairs of the rabbit, hare, or beaver, so as to produce "a vegetable felt," which may be afterwards

dyed. The down may also be mixed with cotton, silk, or grassy fibres and be woven into a fabric, or it may be used in the manufacture of paper.

[Printed, 4d. No Drawings.]

A.D. 1862, May 10.—N° 1410.

RONALD, WILLIAM HENRY.—(*Provisional protection only.*)—
“Improvements in apparatus for signalling and indicating the
“position of shots in rifle practice.”

The apparatus proposed is stated to consist of arms moveable on an axis placed, by preference, below the ground. The arms are long enough to extend over the surface of the target, and discs are made to slide upon them. The marker, by pulling a cord, causes the arm to move and the disc to indicate the exact spot hit. Flags may be attached to the ends of the arms to indicate the value of the hit made.

[Printed, 4d. No Drawings.]

A.D. 1862, May 12.—N° 1417.

FUHRMANN, GUSTAVE.—(*A communication from Frederick Lohmann.*)—“Improvements in melting and boring cast-steel
“barrels applicable to fire-arms and pieces of ordnance.”

A central core of “malleable metal, easily pierced by the boring
“instrument,” is introduced in the centre of the ingot of cast steel intended to be made into the barrel of the gun. This soft part is first bored out, and a hole is made with truth, so as to enable the gun to be easily bored to the required diameter, the boring instrument being “guided in a straight line without
“possible deviation.”

[Printed, 4d. No Drawings.]

A.D. 1862, May 14.—N° 1454.

GIRDLESTONE, JOHN WARD.—(*Provisional protection only.*)
—“Improvements in projectiles.”

A jacket or sabot of soft materials may be attached to the rear end of a projectile, so that it may receive rotatory motion by means of the rifling grooves, and impart a like motion to the projectile. In some cases it is proposed to form grooves or inclines upon the surface of the jacket, or spiral channels through

"portions of its operating lever." The breech piece consists of "an oblong block of steel," which is fitted on a pin or axis passing through its rear part, and also the sides of the frame. The breech piece is moved downwards to allow the cartridge to be inserted in the barrel, and upwards to close the breech, the motion being effected by means of a lever whose long arm works below the stock, and whose short arm is connected with a projecting piece attached to the under side of the breech block, in the upper side of which is "a shallow cavity." The cartridges have metal cases provided with a flange; when fired they are withdrawn by means of an extractor consisting of "a fork arranged to swing upon the fulcrum pin of the breech operating lever toward and from the rear end of the barrel." The lever acts on a "projection on the bottom of the stem of the fork," and when it depresses the breech piece it moves the extractor, which seizes and withdraws the flange of the cartridge. The hammer and tumbler of the lock and "the spindle or arbor to which they are attached" are placed in the metal frame of the stock, "whereby the lock is enabled to be made very strong" without cutting away the stock. The bayonet is attached to a pivot joint, so that it may be fixed and unfixed without removing it from the gun or musket.

[Printed, 1s. Drawing.]

A.D. 1862, June 13.—N^o 1764.

NEWTON, WILLIAM EDWARD. — (*A communication from E. D. Williams & C. W. Field.*)—"Elongated bullets." A concave expanding disc is attached to the rear of the bullet by means of a headed pin. When the charge is exploded the pin is driven upon the concave disc, which is flattened, and so made to fill the bore and prevent windage, while by entering the rifling grooves it gives rotatory motion to the projectile. The pin and cavity are made conical, so that when the pin is driven forward the cylindrical part of the bullet is expanded.

[Printed, 6d. Drawing.]

A.D. 1862, June 17.—N^o 1792.

TURNER, MANSFIELD, and LOSEBY, EDWARD THOMAS.—(*Provisional protection only.*)—"Improvements in small arms and ordnance, and in sights for the same." Smooth-bore guns are to be made to act as rifled guns by inserting in the barrel "a twisted rod or spit" of a square or other form in section; the projectile is made to follow the twist of the rod. Instead of using wood for the stock of a gun, metal is to be employed. An envelope of metal or other casing may be used to

surround the barrel of a short stocked gun to prevent the vibration of the barrel. Telescopic sights with suitably marked notches may be used to enable accurate aim to be taken, and ascertain the distance of the object aimed at by measuring the angle subtended.

The sliding bar of the back sight is to be elevated by a screw motion.

[Printed, 4d. No Drawings.]

A.D. 1862, June 17.—N° 1796.

KELLOW, JOSEPH, and SHORT, HENRY.—“Improvements in the manufacture of blasting powder.”

To produce 100 lbs. of powder, with 30 quarts of water are mixed 30 lbs. of nitrate of soda, 8 lbs. of nitrate of potash, 12 lbs. of chlorate of potash, 10 lbs. of sulphur, 46 lbs. of tan and sawdust; or with 30 quarts of water for the solution, are mixed 36 lbs. of nitrate of soda, 4 lbs. of nitrate of potash, 6 lbs. of chlorate of potash, 10 lbs. of sulphur, 50 lbs. of tan and sawdust (allowing 6 lbs. for evaporation); the tan or sawdust is well dried, ground fine, and sifted. The proportions given may be varied, and to give greater strength to the powder the quantity of the nitrate of soda is reduced and that of the chlorate of potash increased.

[Printed, 4d. No Drawings.]

A.D. 1862, June 18.—N° 1798.

JOHNSON, JOHN HENRY.—(*A communication from Benjamin Berkley Hotchkiss.*)—“Improvements in projectiles.”

Belts of soft metal are attached to the rear end of elongated projectiles, which are made to taper. On the end of the projectile is a cap with a bevelled edge; when the charge is fired the cap is driven forward, and expands the soft metal into the rifling grooves. Powder is solidified by combining it with collodion. Shells are charged by first coating them inside with a solution of shellac dissolved in alcohol, and then introducing the balls, and then filling up with powder, collodion in solution being poured into the shell to fill up the interstices. Percussion fuses are made with strikers sliding in a tube; the strikers are held apart by a wire which is strong enough to resist ordinary motion, and yields when the projectile is fired. Canister projectiles are made with a base of soft

metal, and with longitudinal divisions, which are filled with bullets. Flat fronted projectiles with tapering fronts are used for penetrating armour plates.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, June 19.—N° 1807.

STOKES, WILLIAM, JAMES, CHARLES WEDGE, and STOKES, JOHN.—(*Provisional protection only*).—"New or improved machinery for stocking and screwing guns and pistols."

The machine is to be provided with a compound slide, on which stock to be operated upon is to be fixed. The slide has a longitudinal and transverse motion, and the pattern is fixed parallel to the stock. Over the bed of the machine "is a dovetail in which " a slide carrying the cutting tool and a fixed guide works. The " guide, which consists of a pointed rod, is fixed to the slide in a " vertical position, and the cutting tool which rotates on a vertical " axis is fixed parallel to the guide." Suitable motions, vertical and horizontal, are given to the cutting tool and guide.

[Printed, 4d. No Drawings.]

A.D. 1862, June 21.—N° 1828.

SCHNEIDER, FRANÇOIS EUGÈNE, and SNIDER, JACOB, junior.—"Improvements in the construction of breech-loading " fire-arms."

A portion of the barrel at the breech is cut away for the introduction of the cartridge, and the "reception of the solid breech-piece, which is shaped by two concentric semicircles, one fitting " the bottom of the interior of the barrel, and the other following " the upper part of the outer circumference of the barrel." A tube is fixed on the side of the barrel in which is inserted "an iron or " steel pin, fitting but turning freely therein. This pin carries a " tube with a small projection," which extracts the expended cartridge case; "to the end of the pin is also fastened the solid " breech piece." The tube, which is fixed to the side of the barrel, "serves as a guide when drawing back the breech piece, as " a hinge when turning it on one side, and as a guide in with- " drawing the case of the expended cartridge." The breech piece when turned down is "closed by a spring catch." It carries "in it " a piston which being struck by the hammer explodes the cart-

"ridge." The piston has a "round or conical head." Instead of a piston a nipple may be used, and the charge be fired by a percussion cap in the ordinary way.

[Printed, 10*d*. Drawing.]

A.D. 1862, June 28.—N^o 1898.

GARNIER, JOHN.—"Improvements in ordnance and in projectiles."

Guns are rifled by making them with "fillets or ribs left in the boring" of the guns. Lead coated projectiles are employed. Breech-loading guns are made with a sliding breech piece, worked by rack and pinion.

[Printed, 1*s*. Drawing.]

A.D. 1862, June 30.—N^o 1908.

BYRNES, AUNGIER.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms."

The breech is to be closed by a sliding plug working in a chamber formed in the rear end of the barrel. The charge is ignited by a cap placed upon a nipple.

[Printed, 4*d*. No Drawings.]

A.D. 1862, July 2.—N^o 1925.

PORTER, WILLIAM.—(*Provisional protection only*).—"Improvements in the manufacture of targets."

The front of the target is to be provided with two openings, "one of which only is furnished with an aiming surface and bulls-eye for the time being." The bulls-eye of each opening is to be "represented upon the two angular sides of a plate or surface, bent so as to form a right angle," and mounted upon a "pin or axis at the back of the target."

When one of the "angular sides of the bent plate is over one of the openings," to cover or form the bulls-eye, the other is out of view. When the one in view is struck by a shot it causes the bent plate to turn on its axis, and bring the bulls-eye on the other face into position.

[Printed, 4*d*. No Drawings.]

A.D. 1862, July 3.—N^o 1937.

TURNER, THOMAS, and TAYLOR, WILLIAM.—(*Provisional protection only*).—"Certain improvements in single and double breech-loading fire-arms."

The breech end of the barrel is to be made in the form of a segment of a circle struck from the centre of the axis, on which turns a lever piece which "abuts against and secures the breech" of the barrel. The lever piece may be applied either to single or double barrelled guns.

[Printed, 4d. No Drawings.]

A.D. 1862, July 8.—N° 1966.

RIGBY, JOHN.—(*Provisional protection only*).—"Improvements in breech-loading guns, and in extracting cartridges from such guns, and also in wind sights for fire-arms."

The barrel is to be moved "in a line with the breech until it is free thereof, and then swivel or move on its pivot," which is vertical. The pivot is mounted on an eccentric piece fitted in a bearing in the breech piece, and worked by a hand lever.

In order to withdraw the exploded cartridge "a small nib or projection" is made on the breech piece, and forms a resting place for and holds, the lower part of the cartridge.

In the case of a breech-loading gun that "turns on an axis out of the line of the bore or nearly so," the exploded cartridge is extracted by means of "a cradle-piece," which slides in a recess in the metal of the breech.

An anemometer, consisting of "a small pendent vane," is to be used to measure the pressure of the wind and regulate the position of the wind sight.

[Printed, 4d. No Drawings.]

A.D. 1862, July 8.—N° 1968.

BOURKE, JOSEPH.—(*Provisional protection only*).—"Improvements in military accoutrements."

The soldiers' waist belt is proposed to be made of leather, having a "band of sheet iron" placed over it, and "provided with a plate of leather, forming a truss, to which it is attached at an angle, for the purpose of preventing any strain or pressure on the stomach." Adjustable shoulder straps are fastened by hooks taking into eyes in the "truss or stomach support."

Below the buckle of the waist belt a piece of sheet metal may be attached "for the purpose of supporting the abdomen in cases of dysentery." For a valise for cavalry a piece of waterproof cloth "about seven feet long and four feet wide" may be used; it is provided with straps, and folded so as to form a wallet or valise.

[Printed, 4d. No Drawings.]

A.D. 1862, July 10.—N° 1985.

KELLOGG, HENRY.—“Improvements in breech-loading fire-arms and cartridges therefor.”

The invention “relates to a device for crowding home a metallic cartridge, and for withdrawing the metal casing after the ammunition is discharged.” Levers are connected with the mechanism that moves a sliding breech piece used to close the breech end of the barrel; upon the levers are lips which are “made to press against the end of the cartridge to drive it home, and to catch hold of a rim” to withdraw it when discharged.

Metallic cartridges are used, having a part at the rear end “struck up” or “sunk” or made of “reduced thickness,” to allow the powder to be easily ignited by the cap.

The projectile is made with a conical rear end, and a sabot is placed behind it charged with lubricating material.

[Printed, 8d. Drawing.]

A.D. 1862, July 12.—N° 2002.

GREEN, CHARLES EDMOND, and GREEN, JOHN.—“Improvements in breech-loading fire-arms.”

In order to convert an Enfield muzzle-loader into a breech-loader, the breech plug is removed and a tubular breech piece is attached to the barrel. An opening is made in the tubular breech piece, which is closed by means of a plug made to slide therein; the plug when turned closes the opening.

A safety catch is employed to prevent the trigger from being pulled back, when the sliding plug is not in the proper position. The breech-loading arrangement is applicable to the construction of “new breech-loading fire-arms.”

[Printed, 10d. Drawing.]

A.D. 1862, July 12.—N° 2007.

HILL, THOMAS.—“Improvements in the arrangements employed for the protection of markers at rifle butts, and in the means employed in indicating the score and position of the shot and wiping out the shot mark.”

A covered pit for the marker is made in front of the target. In the cover on the side turned to the target is fixed a thick sheet of

glass. In the side of the cover are openings through which the marker can extend a brush, with which he can efface the shot marks. At the back of the brush is a coloured disc, and by using the proper brush with the requisite coloured disc the position of the shot on the target may be indicated, while the shot mark is being effaced.

[Printed, 10d. Drawing.]

A.D. 1862, July 19.—N^o 2063.

PRATT, ALFRED.—(*Provisional protection only.*)—"Improvements in self-capping fire-arms."

The percussion caps are to be supplied from a tubular receptacle inserted in the stock of the gun. When raising the hammer to full cock self-acting mechanism pushes forward a cap and places it upon the nipple.

[Printed, 4d. No Drawings.]

A.D. 1862, July 19.—N^o 2064.

NEWTON, WILLIAM EDWARD.—(*A communication from Albert Hamilton Emery.*)—"Improvements in ordnance and projectiles for the same."

In the process of "founding ordnance" a hollow core is used to cool the piece by means of water from the interior, and in combination therewith "an envelope or casing of molten metal surrounding the whole or any portion of the mould in which the piece is cast," so as to "retard the cooling of the exterior of the piece to such an extent as may be desirable." This causes the cast metal "to be cooled either entirely or in such proportion as may be desirable from the interior, and thereby causes the contraction of the metal to be wholly or to as great an extent as may be desirable in an inward direction, by which means the whole mass is made solid and free from blemishes." A similar process of casting is applied to projectiles. Projectiles of smaller diameter than that of the bore of the gun are fired by means of sabots. False front parts of soft metal of a shape suited for passage through the air may be fitted upon projectiles intended to penetrate plates.

[Printed, 1s. Drawing.]

A.D. 1862, July 19.—N° 2067.

TRANTER, WILLIAM.—“Improvements in fire-arms.”

The chamber of a revolver fire-arm is provided with a spring lever stop, having a hooked end which is acted upon by a projection on the front of the tumbler or hammer. When the hammer is raised the stop is withdrawn and the chamber is liberated. The “works of the revolver” are provided with a moveable cover, which may be readily removed to allow access to the works. The centre rod of the revolving chamber is fastened by means of a spring lever acting in a cavity; when the spring is compressed the rod may be withdrawn. A lubricating brush or elastic fabric is attached to the ramrod. The grooves of rifle barrels are “made of the form of a hyperbolic curve, for the purpose of getting rid of angles in the cross section.”

[Printed, 4d. No Drawings.]

A.D. 1862, July 21.—N° 2068.

RAMSAY, CHARLES.—(*Provisional protection only.*)—“An improved military cloak.”

The cloak is to be cut nearly circular and to have a hood and sleeves affixed to the neck part. By fixing the hood upon the point of a bayonet attached to a musket and extending the edges of the cloak by pegs a tent may be formed. Buttons and button holes may be fixed to the cloak, so as to convert it into a closed tent.

[Printed, 4d. No Drawings.]

A.D. 1862, July 21.—N° 2072.

DAVEY, THOMAS.—“Improvements in the manufacture of gunpowder and explosive compounds.”

As much starch, or dextrine, or gum, or flour, or sugar as will be dissolved, is boiled with a mixture of one part of nitric acid and three parts of sulphuric acid. The resultant is poured into cold water, and an acidulated preparation is obtained by a straining or “percolation process.” From four to six parts of the acidulated preparation are mixed with 100 parts of the ordinary gunpowder ingredients, saltpetre, charcoal, and sulphur. The mixture may be granulated in the ordinary way, or be forced

through dies and moulded into tubular forms. To "lessen or "replace the sulphur commonly employed," paraffine, petroleum, or other suitable hydrocarbon may be employed.

[Printed, 4d. No Drawings.]

A.D. 1862, July 22.—N° 2079.

CASSEGRAIN, PAUL FRANÇOIS.—"Improvements in fire-arms."

The barrel is turned down or tilted to receive the charge; the axis is supported in a sliding piece which moves in a recess in front of the stock. The barrel is connected to the stock by a link, so that when it is raised it is moved slightly forward, its axis being moved forwards on its sliding piece. Under the breech end of the barrel is a projection fitting into a recess in the stock, and locked by a bolt. The locking bolt is released by a lever hinged in front of the trigger guard. The lever, at the same time that it releases the locking bolt, pushes upwards another bolt that pushes up the projection, and raises the breech end of the barrel.

[Printed, 10d. Drawings.]

A.D. 1862, July 24.—N° 2102.

HORTON, JOHN.—(*A communication from Joseph Reeder.*)—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The fire-arm is to be charged by means of self-acting charging chambers, formed in the stock of the piece. The powder is contained in one tubular charging chamber, the bullets are contained in the other, and each chamber alternately brought opposite the breech end of the barrel and deposits its charge in the breech.

[Printed, 4d. No Drawings.]

A.D. 1862, July 29.—N° 2149. (* *)

DEVLAN, PATRICK SANSFIELD.—(*Provisional protection only.*)—"An improved composition to be employed for covering projectiles and the internal and external surfaces of vessels; which "is also applicable to the manufacture of tubing and to other "useful and ornamental purposes." The improved composition consists of "an admixture and combination of paper or other "fibrous pulp, caoutchouc, or gutta percha, and any resinous

" gum; plumbago may also if required be mixed therewith, the
 " proportions I prefer being about eight pounds of fibrous pulp
 " to half a pound of caoutchouc or gutta percha, and one pound
 " of resinous gum, although such proportions may be varied
 " without materially differing in effect." The composition is
 particularly adapted to the " covering of projectiles."

[Printed, 4d. No Drawings.]

A.D. 1862, August 1.—N^o 2180.

HASELTINE, GEORGE.—(*A communication from Daniel Curtis Rand and Mortimer Wadsham.*)—" Improvements in apparatus
 " for drying grain gunpowder, and other granular substances."

A rotating cylinder is made to turn on a horizontal shaft. Self-acting hinged valves are fixed in the cylinder to allow of the
 " transmission of air for ventilating," the materials to be dried, and permitting the escape of gases. The cylinder is turned in the direction that causes the hinge of each valve to be always foremost, and as each valve comes to the top it drops open, and closes as it passes round. In drying gunpowder, the speed of rotation cannot cause ignition, as when it becomes too great the gunpowder is carried round " motionless with regard to the cylinder."

[Printed, 6d. Drawing.]

A.D. 1862, August 1.—N^o 2186.

NEWTON, WILLIAM EDWARD.—(*A communication from Horace Hollister Day, Michael Ritner, and Josiah Newell Bird.*)—" Improvements in projectiles for ordnance and small arms, and in
 " the wads or sabots to be used therewith."

Elongated projectiles are fired with sabots made of vulcanised india-rubber or other elastic material. The rear end of the projectile has projecting pins or a roughened surface to enable the sabot to be attached to it. The projectile may be made of lead, or lead may be run into a case of iron or steel, to which the required form is given. Spherical or cylindrical projectiles may be fired with the elastic sabots; rotation is given to the sabot by the rifling groove, and is thereby communicated to the projectile.

[Printed, 10d. Drawing.]

A.D. 1862, August 7.—N° 2210.

CULLING, CHARLES.—(*Provisional protection only.*)—"Improvements in fire-arms."

In order to prevent the accidental discharge of a gun, a safety catch is to be attached to the lock. The catch is to be worked by a rod so arranged that it is released by the pressure of the cheek or shoulder of the marksman when the piece is brought to the shoulder.

[Printed, 4d. No Drawings.]

A.D. 1862, August 8.—N° 2224.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Rafael Rafael.*)—(*Provisional protection only.*)—"Improvements in repeating fire-arms."

The barrel is to be loaded at the breech by means of a "many chambered slide, made by preference of steel, and set at right angles to the barrel of the gun." In each chamber a cartridge is inserted, and as each cartridge is discharged the succeeding chamber is pushed up into the place occupied by the one last discharged, the motion being given by means of cams and levers.

[Printed, 4d. No Drawings.]

A.D. 1862, August 11.—N° 2239.

NEWTON, WILLIAM EDWARD.—(*A communication from Stephen Davis Tucker.*)—"Improved machinery for compressing powder for cartridges."

A series of moulds are arranged in a horizontally revolving plate, each mould having a moveable bottom; when filled with the charges of powder the moulds are brought under plungers working with toggle joints; the powder in each mould is compressed by a plunger, and is then discharged through the bottom of the mould.

[Printed, 10d. Drawing.]

A.D. 1862, August 14.—N° 2281.

IRVINE, JOHN, and HAND, JOHN WILLIAM.—"A new or improved rifle rest."

A box or trough lined with india-rubber is mounted on "a strong ball and socket joint fitted with a set screw," and

adjustable at any required height by means of a rack sliding in a hollow pillar or upright. The rifle may be adjusted to be fired from the shoulder or at any required height.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, August 16.—N° 2310.

ITURRIAGA, MANUEL.—(*Provisional protection only.*)—"Improvements in fire-arms."

"A segmental or semicircular bar of iron or steel "is to be pierced or "bored at its periphery in four or other number of "rows, so as to form a number of barrels." The bored piece is to be attached to a metal belt, and the barrels are discharged by means of suitably arranged nipples. The arm completely encircles "the body of the soldier, enabling him to discharge projectiles in every direction around him."

[Printed, 4d. No Drawings.]

A.D. 1862, August 22.—N° 2349.

MOORE, DANIEL.—"Improvements in breech-loading fire-arms."

The breech is closed by means of "double breech blocks, one "sliding on the line of the barrel, and the other at right angles "thereto." The traversing block is drawn away from behind the longitudinally moving block, which is then drawn back, both motions being actuated by a backward or forward motion of a lever which is not connected directly to either block, "hence one "can stand still while the other block is moved."

[Printed, 8d. Drawing.]

A.D. 1862, August 22.—N° 2351.

MOORE, DANIEL.—"Improvements in revolving fire-arms."

The chamber cylinder is made to swing aside from the stock to receive the cartridges. The forward part of each charge chamber is rifled with grooves "corresponding to the grooves in the "barrel."

The cartridge is made of a metallic capsule, which contains the powder and ball, and has a hollow flanged ring containing "fulminating material." The cartridges are "fully sustained at the "time of explosion" by a recoil plate.

[Printed, 8d. Drawing.]

A.D. 1862, August 27.—N° 2377.

LINDSAY, GEORGE.—(*Provisional protection only.*)—"An improved mode of arranging and disposing guns in ships employed in naval warfare and otherwise."

Instead of using a ram attached to the front of a vessel, it is proposed to employ a projecting tube. The tube works through a water-tight aperture made in the bow of the ship, and is closed by a plug. When the tube is propelled against an object it is pushed inboard, and by self-acting mechanism is to be made to discharge a gun connected with it.

[Printed, 4d. No Drawings.]

A.D. 1862, August 29.—N° 2395.

JONES, HENRY.—"Improvements in breech-loading fire-arms."

The barrels are "tilted" or turned down to receive the cartridge in the breech. "A bolt below the breech of the barrels is made by a sliding motion to engage in a hole or recess in the face of the body, and a bar formed in the body at the same time engages in a horizontal slot in the lump on the under side of the barrels; the barrels are thus fixed in a horizontal position at two points during discharge." The fore end and body are connected by a hinge joint. "The middle part of the joint does not fill up the space between the two outer parts, but allows room for a ring to be placed on the axis between it and one of the outer sides of the joint." The ring has two projections, and when the barrels are turned on their joint "the motion is limited by one projection bearing against the bottom of a quadrant recess," which is formed in the outer side of the joint, the other projection bearing against the lump on the barrels.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, September 3.—N° 2435.

ELLIOTT, HENRY.—(*Provisional protection only.*)—"A new or improved instrument or apparatus for extracting the cases of pin cartridges from breech-loading fire-arms, and for re-capping, re-charging, and closing or turning in the said cartridge cases."

The instrument proposed to be used is made with "a long hook on the end of a rod," jointed to a handle like that of a pocket corkscrew. Two holes are made in the rod, one in its axis, the other across the rod; the former "is screwed, and opens into the latter, which is plain." A plug is screwed into the screwed hole, and serves to force down the charge in the cartridge case after it has been withdrawn. Another plug forming a cup closer is screwed in to close the cartridge case.

[Printed, 4d. No Drawings.]

A.D. 1862, September 3.—N° 2443.

BOSSARD, PETER JOHN.—(*A communication from Louis Alexandre Farjon.*)—"Improvements in stoppers for bottles, jars, guns, tubes, and other open-mouthed articles, in taps, and in fixing them in casks and other vessels."

The improvements in stoppers for guns and for other purposes are based upon those for which a Patent was granted to R. A. Brooman, dated November 20, 1860, numbered 1842. They consist in forming a stop which prevents the screw of the stopper from being separated from the socket. The two parts of the stopper may be separated to the greatest extent necessary, but are never disengaged entirely.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, September 4.—N° 2445.

COWAN, BENJAMIN FRANKLIN.—"Improvements in cannon and other fire-arms."

A thimble-shaped charge chamber or cartridge case is employed to contain the charge; it is slit, so that the pressure of the gases of explosion produces "a frictional pressure between the outside of the thimble or cartridge case and the inside of the barrel," and prevents the "backward tendency of the thimble."

The charge is ignited at its fore part, so that no portion of the powder is blown out unconsumed.

[Printed, 8d. Drawings.]

A.D. 1862, September 6.—N° 2465.

JOHNSON, JOHN HENRY.—(*A communication from Louis Michel Descoutures.*)—"Improvements in fire-arms and projectiles."

An elevation sight is made with a moveable bar moved by a vertical screw with a milled head. The rear end of the barrel is closed by a breech piece on which are formed two inclines or cam surfaces; one forces home the cartridge, the other, by a reverse motion, "effects the partial withdrawal of the cartridge from the chamber after the piece has been discharged."

Cylindro-conoidal projectiles are used having raised rings, which are made to take into the rifle grooves. Behind the rings is a packing, which is saturated with lubricating material.

[Printed, 8d. Drawing.]

A.D. 1862, September 6.—N^o 2466.

CURTIS, WILLIAM JOSEPH.—(*Provisional protection only.*)—"An improved construction of breech-loading cannon."

The breech of the gun is to be closed by a breech piece supported on trunnions in a curved frame, secured to the barrel by strap pieces. The breech piece "is so hung as to balance itself, or nearly so," necessitating but little exertion to move it; it is fixed in its place by means of "a bending screw that lies in a line with the axis of the gun, and is operated by a hand lever."

[Printed, 4d. No Drawings.]

A.D. 1862, September 9.—N^o 2481.

HIRST, WILLIAM.—"Improvements in machinery to be employed in the manufacture of paper or linen spool tubes, which machinery is also applicable for the manufacture of cartridge cases."

A strip of paper of suitable width is wound on a roller or reel. The end of the strip is passed between rollers, and is cut into suitable length and shape by self-acting scissors. The paper is passed on by rollers and endless bands, and is pasted by means of a pair of brushes fed with paste from a hopper. The lengths of paper are wound upon a spindle in the required shape, and are detached in the form of a tube, and fall into a box.

[Printed, 1s. 6d. Drawings.]

A.D. 1862, September 11.—N^o 2506.

RICHARDS, WESTLEY.—"Improvements in fire-arms and cartridges."

The barrels of the breech-loading gun are tilted or turned down to receive the cartridges. In order to lock the barrels a self-acting spring catch is employed, which takes into a recess in the barrels. The spring catch is made to slide in the tang of the breech plate, and is "drawn back to open the breeches by a thumb piece on the "top of the stock."

Breech-loading ordnance are made with an opening in the breech end, "passing entirely through it." The breech is closed by a block, which is "arranged to turn on a centre or axis," so that it may be readily swung aside to allow the cartridge to be inserted. A wedge arrangement or incline is used to press the block firmly in its seat. To prevent the escape of the gases a cup or ring of "thin metal or other rigid material is employed." The edges of the metal are lapped. The bottom of the cap being "produced by pieces lapping the one over the other," the cup "is able to expand when the pressure of the gases comes upon it, "still, however, remaining gas-tight."

[Printed, 2s. Drawings.]

A.D. 1862, September 15.—Nº 2530.

RAWBONE, WILLIAM GEORGE. — "Improvements in gun "barrels and in machinery to be employed in effecting the said "improvements, and in tools and machinery for producing inscriptions, ornaments, and devices upon gun barrels, lock plates, and "other metallic parts of small arms, and for producing inscriptions upon saws and articles of cutlery generally."

A bright line, which may be made of silver wire fixed in the barrel, is used as a guide for taking aim at night. A dark line, formed by making a groove in the silver wire and darkening it, is used for a day line. An "undercut dovetail groove" is made in the flat rib of the barrels, in which "the traversing sight of the "fore arm is made to slide." Discs of steel having suitable devices or letters sunk or formed in relief on their peripheries are employed for producing patterns or inscriptions on gun barrels or other articles by means of pressure. A machine constructed upon the principle of the planing machine is used, the work being made to traverse upon a sliding bed, the impressing disc or tool being held in a suitable fixed frame.

[Printed, 1s. 6d. Drawings.]

A.D. 1862, September 23.—N° 2600.

WILKINSON, WILLIAM.—(*Provisional protection refused.*)—"Improvements in the manufacture of knitted elastic fabrics and in the machinery employed therein."

An elastic fabric or web suitable for being made into "sashes for soldiers, for surgical stockings, knee-caps," and for other purposes, is proposed to be made from lapped or plaited india-rubber threads. The threads are to be woven or knitted in "frame-work knitting machinery" of an improved construction.

[Printed, *ad.* No Drawings.]

A.D. 1862, September 29.—N° 2640.

LORD, WILLIAM BARRY, and GILBART, FREDERIC HUGHES.—"Improvements in loading fire-arms and in blasting."

A charge cylinder is attached to an ordinary ramrod. The charge of powder is placed in the cylinder, and is then introduced into the chamber of the barrel and there released by the action of "a mushroom valve" opened by a projecting stem, which is pushed against the breech or bottom of the charge chamber.

[Printed, *ad.* Drawing.]

A.D. 1862, September 29.—N° 2649.

JOHNSON, JOHN HENRY.—(*A communication from Edwin Eastbrook.*)—(*Provisional protection only.*)—"Improvements in shells for war purposes."

The cavity of the shell is to be made by a core of the shape of a "regular or nearly regular polyhedron," leaving angles and corners to facilitate the breaking up of the shell. The fuse is to be introduced into the middle of the bursting charge, so as to fire it at its centre.

[Printed, *ad.* No Drawings.]

A.D. 1862, October 7.—N° 2710.

CUNNINGHAM, HENRY DUNCAN PRESTON.—"Improvements in working the guns, and in performing other necessary work on board ships, and in apparatus employed therein."

Steam-power is applied to working ships' guns. A series of drums extending the length of the battery are placed upon a revolving shaft made to work in a convenient position in relation

to the gun-carriages. Suitable tackles are attached to the drums, and may be engaged with or disconnected from the gun-carriages as required.

For working guns in turrets the steam power is applied by means of a piston rod connected to the gun-carriage, and working in a suitably-arranged cylinder; the turret is made to turn by means of a system of ratchet wheels. Self-acting counterpoise apparatus, and traversing tables, and rammers, are used for raising the projectiles or cartridges to the height and position required for loading the guns, and for ramming home the charge. Steam power is applied to the capstan or windlass used to raise or lower the anchors.

[Printed, 4s. 6d. Drawings.]

A.D. 1862, October 9.—N° 2723.

BUSH, WILLIAM.—(*Provisional protection only.*)—"Improve-ments in cannon and small arms."

The gun is to be made "in two parts, the one the barrel for containing the projectile, the other the breech and chamber for containing the powder." The two parts are to be connected by screws, and to be made to slide when disconnected, so that the charge chamber can be turned down upon a hinge.

[Printed, 4d. No Drawings.]

A.D. 1862, October 11.—N° 2744.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Louis Julien Gastinne.*)—"Improvements in breech-loading fire-arms."

The "Lefauchaux cartridge is used with detonating powder for ensuring central fire." The cartridge is discharged by means of a piston hinged by a pin to a horizontal plate working in the breech. A projection on the plate is struck by the hammer, and the piston being driven forward in a line with the axis of the barrel discharges the cartridge. The barrels are tilted to receive the charge. A cartridge extractor is made to protrude when the barrels are tilted by means of an "upright plate formed with a notch on the under part," which is fitted "on the bolt on which the barrel and fore part of the stock are free to tilt." The "fore end of the back part of the stock coming against the notch on the plate forces the upper part of the plate forward, which, coming in contact

" with the fore end of the extractor, causes the rear end thereof to be protruded."

[Printed, 10*d*. Drawing.]

A.D. 1862, October 11.—N^o 2747.

BOUCH, THOMAS.—"Improvements in machinery or apparatus for charging or filling cartridges."

A metal frame, which may be attached to a table by a pinching screw, is provided at its back part with a frame carrying feeding hoppers, which are made to feed a charge of powder and shot from alternate cells. Paper cartridges are placed "in vertical cells," and wads are fed from a feeding hopper. The cartridges are successively brought under the hopper for supplying the powder, and are "rammed down by means of the filling tubes," which are "connected to a crosshead having laterally projecting handles, "and working on vertical guides." Another wad is placed on the top of the powder, and the shot is introduced, then a closing wad, and by means of a spindle the edge of the cartridge is turned over.

[Printed, 1*s*. 10*d*. Drawings.]

A.D. 1862, October 13.—N^o 2755.

LOEDER, WILLIAM.—(*A communication from Gabriel Dümmler.*)—"An improved projectile to be used with ordnance or fire-arms of any caliber."

The projectile is made in two parts, the fore part being made to fit in the hind part, a cavity being left between them. In the cavity is a stem on which a percussion cap is fitted, and it is surrounded by a bursting charge of powder. When the projectile strikes an object the fore part is forced down upon the cap, and the bursting charge is exploded. The charge may be regulated so as to drive forward the fore part as a projectile without breaking the hind part, or it may be made to burst the projectile into fragments.

[Printed, 6*d*. Drawing.]

A.D. 1862, October 20.—N^o 2819.

HASELTINE, GEORGE.—(*A communication from Alonzo Hitchcock.*)—"Improvements in forging cannon and other heavy articles."

The cannon are made by welding together rings of wrought-iron or steel in a heating furnace, the rings being heated in an adjoin-

ing furnace. A steam hammer is made to work through an opening in the top of the heating furnace, and the welded mass is supported upon a table connected with a hydraulic press, which holds it at the required height to enable its upper surface to be brought to a welding heat and allow heated rings to be successively welded to it.

[Printed, 8d. Drawing.]

A.D. 1862, October 25.—N° 2875.

BROWN, DAVID, and BROWN, WILLIAM.—(*Provisional protection only.*)—"Improvements in rolling machinery for rolling gun barrels, cannons, and other articles."

An intermittent rotatory motion is to be given to rolls employed for rolling gun barrels by means of loose-toothed wheels, so arranged that the rolls may be "brought to rest at the proper times for the purpose of permitting of the ready introduction of the gun barrel or other article between the rolls."

[Printed, 4d. No Drawings.]

A.D. 1862, October 29.—N° 2910.

KRUPP, ALFRED.—"Certain improvements in breech-loading ordnance and fire-arms."

The breech of the gun is closed "by means of a sliding valve or wedge piece moving at a right angle or other angle to the axis of the bore of the gun. This wedge piece or sliding valve works horizontally, and may be provided with various arrangements for the purposes of more effectually preventing the escape of gas at the breech when the piece is discharged, and of simplifying manipulation." When the piece is loaded the wedge piece is drawn on one side, the charge is inserted, and behind it is placed an annular packing piece, made of metal or suitable elastic, fibrous, or other material. The wedge piece is then pushed back in its place. Various modifications of apparatus are described for the purpose of effectually securing the wedge piece in its place and releasing it after discharge, and for properly fixing the packing piece and insuring its withdrawal after the piece is fired. The system is described as applied to guns of all calibres, including field and siege guns.

[Printed, 2s. 10d. Drawings.]

A.D. 1862; October 30.—N° 2931.

GIFFARD, PAUL.—“Improvements in air guns and other air arms.”

The air is compressed by means of an air pump, which “lies parallel with the barrel of the gun” and extends along it. “All the compressed air is utilized,” by employing a valve arrangement, which enables its action on the projectile to be “rendered instantaneous.”

[Printed, 8d. Drawing.]

A.D. 1862, October 31.—N° 2949.

NEWTON, WILLIAM EDWARD.—(*A communication from William Judson.*)—“Improvements applicable to the carriages and beds of guns, mortars, and other ordnance.”

Rings or beds of india-rubber are fitted in frames to form beds for the trunnions of guns. “In order still further to counteract recoil, the gun carriage may be placed on a platform or bed, the ends of which are provided with blocks of india-rubber.”

For mortars a bed of india-rubber is used, and the piece is held down by strong bars.

[Printed, 8d. Drawing.]

A.D. 1862, November 4.—N° 2979.

JOHNSON, JOHN HENRY.—(*A communication from John Ridgway.*)—“Improvements in hanging, arranging, and operating ordnance.”

The required number of guns are hung or arranged in a frame which is made to revolve in a vertical plane, and also in a horizontal plane, by means of steam or other power. The guns are mounted between two circular plates or wheels revolving on a horizontal axis upon a frame which revolves upon a vertical axis.

[Printed, 10d. Drawing.]

A.D. 1862, November 6.—N° 3005.

MONIN, BENOIT THÉODORE ULYSSE.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms.”

The gun is to be loaded at the breech by self-acting charging apparatus, consisting of "a sliding key, which, when removed, opens an aperture leading from the bore of the gun to the butt end or stock." A magazine of cartridges is contained in the stock, and the cartridges are made to advance by means of an endless belt, running on rollers, which are moved by the action of the trigger.

[Printed, 4d. No Drawings.]

A.D. 1862, November 7.—N° 3012.

NEWTON, ALFRED VINCENT.—(*A communication from William Albert Shepard.*)—(*Provisional protection only.*)—"Improvements in repeating fire-arms."

The rotating charge cylinder "is made to revolve by means of a flexible arm" of a forked lever, which works in ratchet teeth cut on the rear end of the cylinder. The cartridges contain their own ignition, and are exploded by a blow from the point of the hammer.

[Printed, 4d. No Drawings.]

A.D. 1862, November 11.—N° 3038.

PALLISER, WILLIAM.—"Improvements in the construction of ordnance, and in the projectiles to be used therewith."

Built-up guns are made of "concentric tubes of different metals, or of the same metal differently treated, so that as nearly as possible, owing to their respective ranges of elasticity, when one tube is on the point of yielding all the tubes may be on the point of yielding." The interior tube is made of "ductile wrought iron," so coiled that its fibres run "circumferentially or spirally;" the next tube is made of "a harsher and less extensible iron;" the outer tube is of "coiled shear steel," or welded steel, whose strength is increased "by tempering it at a medium heat in oil." The breech is closed by screwed plugs. Cyliandro-conoidal projectiles having soft metal studs are used. For penetrating armour plates, a wrought-iron projectile having a ring of hardened steel fixed upon its fore part is employed.

Cast-iron guns are strengthened by boring them out "until their thickness of metal at the breech" is about "equal to the radius of the new bore;" the bore is then made "slightly

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" taper, larger towards the muzzle; tubes such as are above described are then inserted from the muzzle." In some cases the inserted tube may taper at the breech, like a soda-water bottle. Gun metal is then run in through an aperture in the cast-iron gun and surrounds the breech end of the tube. In some cases the cast iron may be cast round an inner tube.

[Printed, 6d. No Drawings.]

A.D. 1862, November 13.—N° 3054.

RENDEL, GEORGE WIGHTWICK.—(*Provisional protection only.*)

—"An improved method of strengthening and hardening cannon made wholly or partially of carbonized iron or steel, or the barrels or other parts thereof."

The cannon or parts of cannon are to be heated in a suitable furnace, and then plunged into a bath of oil or other liquid; in some cases the oil or liquid may be poured over the heated metal. The temperature of the liquid bath is kept down by causing cold water to circulate through pipes placed in the bath.

[Printed, 4d. No Drawings.]

A.D. 1862, November 15.—N° 3084.

PALMER, FITZMAURICE.—"Improvements in projectiles."

Hollow projectiles are made with the weight distributed in such a manner that the fore part "shall contain a large excess, say two-thirds, of the entire weight of the projectile." The projectile is constructed of a series of rings or compound rings, so arranged that on explosion the shell is broken up into any required number of fragments.

[Printed, 10d. Drawing.]

A.D. 1862, November 17.—N° 3091.

RICHARDS, GEORGE.—(*Provisional protection only.*)—"Improvements in the construction of ordnance and fire-arms, and in the projectiles to be used therewith."

The improvements proposed are based upon those described in the Specification of prior Letters Patent of April 25, 1862, N° 1208. The gun is to be rifled by making spiral ribs or projections upon the interior surface of the barrel. The projectiles are made "simply to bear upon the surfaces of the projecting

"rifling." Polygonal projectiles may be employed. They may be made entirely of iron, or of iron coated with soft metal.

[Printed, 6d. Drawing.]

A.D. 1862, November 22.—N° 3141.

NETHERSOLE, WILLIAM EDWARD, and BUCKLAND, CHARLES.—"Improved safety signals for fire-arm practice."

Flags or signals are placed upon arms turning on a pivot behind the target. By means of ropes and pullies or rollers the signal apparatus is turned by the marker, so as to indicate by the signal displayed the position of the hit. The ropes may be carried underground from the target to the marker's butt, and be worked by lever handles.

[Printed, 10d. Drawing.]

A.D. 1862, November 26.—N° 3173.

AUSTIN, WILLIAM.—(*Provisional protection only.*)—"An improved material for the manufacture of cartridge cases, applicable also for tubing and various other useful purposes."

A woven fabric of cotton or flax is to be coated with adhesive solution, and paper is to be applied to the surfaces and pressed upon them. The adhesive solution may be waterproof. Instead of sheets of paper, paper pulp may be applied to the surfaces of the fabric, or it may be covered with leather, or silk, or other material.

[Printed, 4d. No Drawings.]

A.D. 1862, December 1.—N° 3219.

ROMER, JOSEPH.—"Improvements in the manufacture of bullet wire and metallic fine-drawn wire."

Wire suitable for being made into epaulettes and military ornaments is made by drawing the wire through suitable orifices formed by, or made in, hard precious stones. The stones are fixed in beds or holders of metal, which are adjusted by screws, and the wire is drawn through in the usual way.

[Printed, 4d. No Drawings.]

A.D. 1862, December 2.—N° 3234.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Daniel Treadwell.*)—"Improvements in apparatus for discharging guns or ordnance."

In order to prevent the escape of the gases of explosion through the vent a punch or striker is fitted to work in a recess formed round the top of the vent. The primer or fuse has a button head, and the blow is given upon the striker; it is held down firmly and covered, so as to prevent all escape of gas. When it is required to fire the piece with an ordinary primer it may be done in the ordinary manner.

[Printed, 1s. 10d. Drawings.]

A.D. 1862, December 5.—No 3262.

CHRISTOPH, LOUIS, HAWKSWORTH, WILLIAM, and HARDING, GUSTAVUS PALMER.—“Improvements in drilling, drawing, and rolling metals, and in the machinery or apparatus employed therein.”

In drawing metals in a cold or hot state “a screw spindle is used in lieu of the traversing chains” previously employed.

“When tubular articles of any kind requiring great strength are required, as, for example, the bore or coils of ordnance, it is proposed to draw one tube inside an outer tube by the aid of an internal mandril, the expansion of the inner tube causing it to be forcibly held inside the outer one without the necessity for heating either tube, as in the ordinary method.”

Tubes may be rolled or drawn over a core so made as to “be capable of subsequent extension and contraction in diameter” for the purpose of enabling it to be readily withdrawn from the tube.

[Printed, 2s. 2d. Drawings.]

A.D. 1862, December 9.—No 3297.

BENTON, MARSHALL FRANKLIN.—(*A communication from Samuel Ricker.*)—(*Provisional protection only.*)—“Improvements in the manufacture of gunpowder.”

The composition is proposed to be made by mixing 38 parts of water with 2 parts of pulverised charcoal, “boiled together, so that the charcoal may become dissolved.” 28 parts by weight of chlorate of potash are added, with 6 parts of a mixture composed of 4 parts of half-calcined sea-grass, and 2 parts of pulverised sea-coal; 7 parts by weight of sawdust are then added, and the mixture boiled.

Nitrate of soda may be used with nitrate of lead; or $2\frac{1}{2}$ parts of wheaten flour may be mixed with 10 parts of chlorate of potash, and to the mixture may be added $7\frac{1}{2}$ parts of double carbonate of soda, 4 parts of nitrate of lead, $1\frac{1}{2}$ parts of pulverised sea-coal, and 1 part of pulverised charcoal. The two mixtures are compounded in a mortar with 3 parts of water.

[Printed, 4*l*. No Drawings.]

A.D. 1862, December 9.—N^o 3300.

JEFFRIES, GEORGE. — "Improvements in breech-loading fire-arms."

The improvements are based on those described in the Specification of a former Patent, dated January 2, 1862, N^o 22, in which is described a breech-loading arm in which the barrels move horizontally aside upon a vertical axis to receive the charge. The vertical axis is placed "in the centre line of the piece," and the breech plate, against which the ends of the barrels abut, is "flat, and at right angles to the centre line." Underneath the barrels there is a wedge piece or incline which enters and acts with a corresponding recess in the body, and "draws the breeches of the barrels firmly against the breech plate." The lateral motion is given to the barrels by a lever that "fits under the trigger guard."

[Printed, 10*l*. Drawing.]

A.D. 1862, December 9.—N^o 3304.

NEWTON, WILLIAM EDWARD.—(*A communication from Leonard Kastli and Charles Custer.*)—"Improvements in fire-arms."

The number of parts of which the lock is composed is considerably reduced. There are three principal parts, the hammer, the lock plate, and the spring. The screw of the lock plate secures the lock to the stock, and holds the hammer. The spring is held by a stud fitting into a hole in the lock plate; its outer end has two notches which receive a cam piece fixed on the inside of the hammer. "The other end of the spring also acts on the hammer, which is relieved by means of the trigger from the notches."

[Printed, 10*l*. Drawing.]

A.D. 1862, December 11.—N° 3326.

VICKERS, THOMAS EDWARD.—“Improvements in the construction of Ordnance.”

A solid block of steel or iron is formed by rolling or hammering it; it is then bored out to the size required for the piece. The block is then heated in a furnace “to a heat sufficient to expand the crystals in the mass, and while the block is still in the furnace,” the hollow part of the block is cooled by a stream of water or other liquid, “which is continued until the gun is cooled down entirely.”

[Printed, 6d. Drawing.]

A.D. 1862, December 17.—N° 3367.

ALBINI, AUGUSTO.—“Improvements in breech-loading fire-arms.”

The breech end of the barrel is prolonged, and its upper part is open to admit a cartridge. “Upon the prolonged part is a cap connected with a screw plug,” which screws into and closes the prolonged part. A rod passes through a hole in the screw plug, terminating in a conical plug, which closes the conical end of the charge chamber. The rod is semi-cylindrical through the greater part of its length, and is cylindrical and of small diameter at its outer end. The rod is moved by a knob. When the rod is pushed home, the plug closes the breach, and is turned by a handle and locked. By half turning the handle, the plug is released, and may be drawn back to allow the cartridge to be inserted.

[Printed, 1s. Drawings.]

A.D. 1862, December 19.—N° 3399.

DAVIDSON, DAVID.—“Improvements in the construction of telescopes, and in the method of arranging and fixing the same in combination with fire-arms, for the purpose of adjusting the aim thereof.”

The field bar of the telescope has two slides; which move at right angles to each other, and are worked by screws; each slide carries a cross hair or line, one being vertical the other horizontal. The telescope is fixed at the side of the piece, the tube being held in collars; that next the eye piece “is constructed with a neck furnished with projections,” the neck “entering a correspond-

"ing hole in the escutcheon plate of one of the lock screws, the lugs taking hold of the inside of the plate on the collar being "twisted." A joint is thus formed by which a sufficient amount of elevation or depression can be given to the telescope. The collar at the object end "is furnished with a quadrant," which presses "against a plate of metal inserted into the stock," and which may be clamped at any required angle, so as to regulate the elevation of the barrel.

[Printed, 8d. Drawing.]

A.D. 1862, December 20.—N° 3404.

BLAKELY, ALEXANDER THEOPHILUS.—"Improvements in "breech-loading ordnance."

The breech is closed by a breech piece which "projects into the barrel, and is retained in position by weight or elastic pressure proportionate to the power exerted by the pressure of the charge in firing. The firing causes the propulsion of the projectile, "and at the same time the recoil of the breech piece, thus opening the parts for the supply of a fresh charge." The breech block is supported upon rails, on which it slides, and is drawn into the breech by means of a weight attached to a chain. The recoil forces back the breech block into the position which it must take to allow the charge to be inserted.

[Printed, 6d. Drawing.]

A.D. 1862, December 24.—N° 3435.

TRONCHON, ALFRED PIERRE.—"Some improvements in the "construction of fire-arms."

A hole is formed "through the entire length of the stock, so as "to communicate with the barrel," and forms a tubular magazine for containing the cartridges. A self-acting feeder moves forward the cartridges as they are required, being connected with the lock motion in such a way that when the piece is cocked a cartridge is pushed onwards into the charge chamber.

[Printed, 10d. Drawing.]

A.D. 1862, December 26.—N° 3452.

CLARK, WILLIAM.—(*A communication from Philippe Antoine Mathieu and Jules Félix Gévelot.*)—"Improvements in fire-arms,"

A revolver is attached to the stock of a gun intended to be used at long distances; the revolver is to be used in case of need at close quarters. The revolver may be detached and used as a separate arm when required.

[Printed, 1s. 2d. Drawings.]

A.D. 1862, December 29.—N^o 3466.

HASELTINE, GEORGE.—(*A communication from John Winfield Bailey.*) — (*Provisional protection only.*) — “Improvements in “cartridges, and in the mode of charging small-arms and “ordnance.”

The powder charge is to be separated by means of perforated discs into compartments. The flame is successively communicated from one compartment to another, and “perfect ignition “of the powder is secured.” A great range is thus obtained and the danger of bursting is greatly decreased.

[Printed, 4d. No Drawings.]

A.D. 1862, December 29.—N^o 3469.

BILLINGHURST, WILLIAM, and REQUA, JOSEPHUS.—“An “improved portable battery.”

The battery consists of a series of breech-loading barrels mounted in a frame, so arranged that the barrels may be made to diverge more or less. The cartridges are supplied by self-acting feeding apparatus. The whole battery is placed on a light field carriage, and is capable of being fixed at any required elevation when the barrels are fired.

[Printed, 8d. Drawing.]

A.D. 1862, December 30.—N^o 3478.

RICHARDS, WESTLEY.—“Improvements in cannon and other “fire-arms and in apparatus connected therewith.”

The breech is closed by a moveable breech piece inserted in a slotted recess; behind the breech piece is inserted a stopper connected with a stem, and introduced through the open end of the breech. In order to load the piece the breech block is raised until it is clear of the bore, and the stopper is drawn out of the back by hand. Lever apparatus may be used to raise a heavy breech piece, or a shot rack may be connected with it in such a manner that the weight of the projectile is made to counter-

balance the weight of the breech piece. The breech is made gas-tight by means of an annular piece of felt or other fibrous material saturated with lubricating material. In the use of guns with a polygonal rifled bore, with projectiles somewhat smaller than the bore to allow of windage, there is a tendering to jam, the projectile in resisting the force applied to rotate it strives more or less to force the sides of the bore apart. To overcome this tendency a groove is formed in each angle of the bore, in which a wing attached to the projectile fits. Mechanically fitting projectiles are provided with grooves which receive the fouling deposits and carry them away.

To enable the breech-loading guns to be used as muzzle-loaders, metal cases are fitted in the breech and make it close and gas-tight.

For moving the slide of the back sight of a rifle, teeth are cut in the edge of one of the side bars of the flap and the slide is moved by a screw, the thread of which enters the teeth of the flap. A simple rest is made by mounting a frame on a ball and socket joint carried by a tripod support.

[Printed, 2s. Drawings.]

A.D. 1862, December 31.—N° 3485.

FIELD, JOHN WILLIAM PARKER.—“Improvements in breech-loading fire-arms.”

In order to effect a “diminution of metal in the joint piece, so as to admit of its being inserted in the wood,” and to form a front action gun lock, “a slotted bolt with a rectilinear motion” is applied to the pivot of the lever. The bolt is “projected into a notch to close a joint by means of a cam or cams formed or fixed on the said pivot of the lever.” By using this form of bolt the “width of the metallic joint piece is reduced so as merely to form a guide on each side of the bolt.”

[Printed, 6d. Drawing.]

1863.

A.D. 1863, January 3.—N° 30. (* *)

NEWTON, WILLIAM EDWARD.—(*A communication from George Washington Beardslee and Frederick Edwards Beardslee.*)—“An

“improved method of firing or discharging cannon and other fire-arms, a part of which invention is applicable generally to the firing of charges of powder.”

1st. “The firing of cannon and other fire-arms by means of currents of electricity, and without the use of a vent or touch-hole.”—A conical hole is formed in the breech of the cannon and in line with the axis of the bore, “with the greater diameter inside;” to this hole is accurately fitted an enamelled conical plug of metal. “The metallic surface of the inner end of the plug, or at least a portion of it, should be left uncovered,” to make electric contact with one of the fuse wires.”

2nd. “The fuse by which a charge of powder, wherever desired, may be fired by means of a current of electricity.”—Two copper wires are inserted into a block of wood, which may be termed “the holder;” the edges of the extreme ends of the wires should be completely in contact with the wooden holder.” “The other ends of the wires are left to project from the block to a sufficient length for a purpose to be presently described.”

The extreme ends of the two copper wires are connected by a mark “made with a pencil of the softest and purest plumbago.” A small case containing a small charge of powder is in contact with the plumbago line. When one pole of a magneto-electric machine is in contact with the bore of the gun, and the other with the conical plug, the electric current traverses the fuse wire that projects from the centre of the cartridge, ignites the powder in contact with the plumbago, and completes the circuit through the fuse wire in contact with the bore.

[Printed, &c. Drawing.]

A.D. 1863, January 6.—No 51.

WHITWORTH, JOSEPH, and HULSE, WILLIAM WILSON.—“Improvements in ordnance.”

Guns are made of “homogeneous metal or mild steel, or steel, iron, or other similar material,” by casting an ingot with a hole through it, and hammering it while hot upon a mandril. An angular-shaped anvil block and hammer are used, with a mandril of a taper form. When the mandril becomes too hot it is withdrawn, and a cold mandril is substituted in its place. Sometimes a hollow mandril is used, and the interior is cooled with water. The hammered tubular ingot is subsequently annealed. If necessary “the interior surface of the tubular ingot may be ‘con-

"verted to the required depth." For heavy guns the inner tube is made from a tubular ingot, and is strengthened by a series of hoops or cylinders put on by hydraulic pressure. The breech is closed by a double or triple stepped screw, which engages in female screws cut in the inner tube and in the interior of the second or third series of hoops.

The trunnion hoop is cast with a hole through it, and afterwards bored, and a screw is then cut in it, or the trunnions may be made part of an outer hoop.

[Printed, 8d. Drawing.]

A.D. 1863, January 6.—N° 52.

JOHNSON, JOHN HENRY.—(*A communication from Rufus Waples and Pascal Plant.*)—(*Provisional protection only.*)—"Improvements in rocket torpedos, and in the apparatus for directing the flight of the same under water."

The rocket torpedo is to be fired below the surface of the water. Hinged guiding or steering wings are to be attached "to the rear end of the torpedo, which will open out or expand by the action of the gases issuing from the rear end of the torpedo."

[Printed, 4d. No Drawings.]

A.D. 1863, January 9.—N° 82.

PRICE, GEORGE BROOKE.—(*Provisional protection only.*)—"Improvements in sights for fire-arms."

A small spirit or liquid level is to be attached "to the slide of the flap of the elevation sight," transversely to the bore of the barrel. The marksman is thereby enabled to ascertain when the sights are vertical.

[Printed, 4d. No Drawings.]

A.D. 1863, January 15.—N° 136.

MURRELL, CHARLES.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The breech end of the barrel is to be closed by means of "a short solid piece of metal" hinged to the breech. A hemispherical projection on the block fits into the cavity of the breech. The rear end of the block has an inclined face that fits against another piece "disposed behind it in a line with the breech."

[Printed, 4d. No Drawings.]

A.D. 1863, January 17.—No. 154.

HAYCRAFT, GEORGE.—“Improvements in powder flasks.”

The mouth of the powder flask is closed by a “hollow cylindrical stopper, with a screw thread formed upon the outer side of it.” A corresponding female screw is formed in the neck of the flask. The stopper projects into the interior of the flask; it is closed at the end by a milled head piece, and serves when “the flask is open as a measure for the powder, being made to contain one charge thereof.”

[Printed, 6d. Drawing.]

A.D. 1863, January 23.—No. 214.

HUGHES, EDWARD THOMAS.—(*A communication from Alexander Schmalz.*)—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms.”

The barrel of the fire-arm is to be united “to a bed extending from the breech under the said barrel by a joint.” The breech is opened or closed by means of “a lever, one part of which is jointed to a tongue protruding from the under side of the barrel, whilst another part is in communication with slots or passages cut in the under part of the breech.”

[Printed, 4d. No Drawings.]

A.D. 1863, February 3.—No. 305.

BLAKELY, ALEXANDER THEOPHILUS, and VAVASSEUR, JOSIAH.—“Improvements in projectiles for ordnance.”

Projectiles are made “with grooves in the body and rear end thereof for receiving lead or other soft metal.” The grooves are formed, by preference, “at an angle to the axis of the projectile and in the reverse direction to that of the rifling of the gun in which they are to be used.” The grooves are made more or less deep, as required.

[Printed, 8d. Drawing.]

A.D. 1863, February 4.—No. 320.

FAULKNER, CHARLES, FAULKNER, DAVID, FAIRLEY, JAMES, and STIFF, WILLIAM CHARLES.—“Improvements in the manufacture of gun barrels.”

"Moulds" for military or other guns are made in the ordinary way, of the requisite size and form, and are welded at the joint by passing them through grooved rollers. In this state the partially formed barrel is "converted into steel," and then the operation of rolling or elongating the barrel by rolling is completed, "using" by preference internal as well as external pressure."

Instead of commencing with the "mould" made in the ordinary way, one formed of cast or other steel may be taken, and before the welding is effected the mould is decarbonized, and after being welded and elongated by rolling the tube is recarbonized.

[Printed, 4d. No Drawings.]

A.D. 1863, February 6.—N° 331.

BATES, BENJAMIN FRANKLIN.—(*Partly a communication from Charles Macy.*)—"Improvements in cannon and in projectiles to "be used therewith."

The gun is made with a hole through its breech, which is made, by preference, of a polygonal form in section, and spiral. To the rear of the projectile is attached a stem that fits in the breech and polygonal in section. Behind the projectile, which is slightly smaller than the bore, is placed a disc, which accurately fits the bore. The disc may be made of soft metal, and the stem of the projectile passes through a hole in its centre. When the powder charge, which is placed behind the disc, is fired, the projectile is driven out, and rotation is given by means of the spiral stem; the disc falls off from the projectile during its flight. The hole in the breech may be plugged up and the gun used as a muzzle-loader.

[Printed, 10d. Drawing.]

A.D. 1863, February 6.—N° 332.

HEINTZMANN, ALEXIS, and ROCHUSSEN, THEODORE ANTHONY.—(*A communication from Charles Berger.*)—(*Provisional protection refused.*)—"An improved boring bench for "gun barrels."

The gun barrel is to be bored by a boring bit that does not revolve, but is advanced into the barrel by means of a spiral screw. The barrel is made to turn horizontally on its axis. The various motions of the barrel and forward motion of the bit are regulated by drums or wheels.

[Printed, 4d. No Drawings.]

A.D. 1863, February 10.—N° 362.

HILL, THOMAS.—“Improvements in the arrangements employed for the protection of markers at rifle butts.”

Mantlets are constructed of shot-proof materials. The mantlet is placed on one side of the target, “the side or edge nearest the target being formed with a wing or wings placed at an angle inwards towards the marker, and having a small window” protected with plate glass or gauze. A splash board is fixed near the edge of the target, and a space is left between the board and the wing. The marker passes a brush or signal through the space and wipes away or signals the “hits” made on the target.

[Printed, 10d. Drawing.]

A.D. 1863, February 14.—N° 406.

WALSH, JOHN HENRY.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms and in the cartridge cases to be used therewith.”

A false breech is to be attached to the barrel of the piece “by a strap and hinge joint working sideways.” A central striking pin is to be used for firing the cartridge. A steel cartridge case is to be employed; it has its front part formed of paper or silk, or other fibrous material, attached to the case by a cement which is composed of three parts of a solution of gum arabic in water and one part of copal spirit varnish.

[Printed, 4d. No Drawings.]

A.D. 1863, February 14.—N° 411.

WALKER, FRANK EMSDORFF.—“Improvements in the construction of breech-loading fire-arms.”

The gun and cartridge are made on the “Lefauchaux” principle. “The action is let into the stock, leaving the wood on each side, so that the locks may be let into the wood also as in an ordinary muzzle-loading gun. The locking part consists of a steel tumbler carried by a pin, which passes through the body of the action, and the said tumbler has a lever or handle attached thereto, which, when the gun is closed, partly covers the guard of the gun, and, by means of this lever giving motion to the tumbler, the barrels are opened or closed. A link connects the lever and the barrels in such manner that by moving the lever

"forwards or backwards the barrels are opened or closed, and
 "when the lever is moved into position with the guard the gun
 "is locked securely." A safety bolt is used to prevent the piece
 from being fired when the barrels are not securely locked in their
 proper position.

[Printed, 10d. Drawing.]

A.D. 1863, February 16.—N° 418.

WATTS, JOHN BURCHLEY.—(*Provisional protection only.*)—
 "Improvements in the manufacture of matchets and swords."

Matchets are proposed to be made from ordinary "matchet
 "steel" by forming the blades with the tang and point roughly
 shaped by means of rolls. The matchets are to be finished in the
 ordinary way. Points of swords are also to be formed by the
 rolling process.

[Printed, 4d. No Drawings.]

A.D. 1863, February 17.—N° 433.

HOME, GEORGE.—(*Provisional protection only.*)—"Improve-
 "ments in projectiles."

Apertures, depressions, or cavities are proposed to be made in
 or upon the surfaces of projectiles, having inclined surfaces on
 which the gases of explosion may so act as to give rotation.

[Printed, 4d. No Drawings.]

A.D. 1863, Februar 18.—N° 446.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from
 Isaac Hartshorn.*)—"Improvements in breech-loading fire-arms."

The improvements are based upon those described in the Speci-
 fication of prior Letters Patent, dated November 15, 1855, N° 2581.
 The charge chamber is formed in a "cartridge block," which is
 made to abut upon and coincide with the rear end of the barrel
 when the piece is charged, and is raised to receive the cartridge.
 Metallic cartridges are used. The cartridge block "is secured to
 "a guard lever by screws, and is connected with the barrel by
 "means of a double link, one end of which is pivotted to the
 "forward part of the breech by a pin," and the other end is
 pivotted "to the cartridge block by another pin, so that the
 "cartridge block may turn upon either pin." The empty cart-
 ridge case is freed from the barrel as the cartridge block is moved

When the piece is charged the cartridge block is held securely in its place by means of a bolt fitting into a recess in the breech. To prevent corrosion between the breech pin and the cartridge block on which it slides, a bushing made of alloy is inserted in the rear of the cartridge chamber. The alloy is made of 60 parts of copper, 20 parts of nickel, and 20 parts of zinc.

[Printed, 1s. 2d. Drawing.]

A.D. 1863, February 18.—N° 447.

REED, FREDERIC JOHN.—(*A communication from Joseph Atkinson Yates.*)—"Improvements in apparatus for traversing guns."

"Directly under the left rail of the chasses, and near the rear transom, is a shaft called the upper horizontal shaft; it is attached by and turns in two bearings affixed to the under surface of the left-hand rail;" this shaft is turned by a cranked handle. "Upon the outer and lower edge of the rear transom is a horizontal counter shaft;" on its outer end is a cog wheel driven by a pinion, fixed on the upper shaft directly outside the rail; on the inner end is a bevelled wheel which drives a larger bevelled wheel on an upright shaft, turning in bearings fixed to the rear transom. "Upon the lower end of the upright shaft is fixed a pinion, which works into a circular toothed rack."

[Printed, 8d. Drawing.]

A.D. 1863, February 20.—N° 468.

CLARK, WILLIAM.—(*A communication from Charles Wesley Stafford.*)—"Improvements in projectiles for ordnance."

An elongated projectile is made by covering a steel bolt of a calibre smaller than the bore of the gun with a casing of wood or other light material. The bolt is provided with a cutting face.

A rear cap of metal is applied to the bolt in such a manner as to hold the wood casing, and attach packing to it, and also guide the rear end of the projectile. A front cap of metal is attached to the bolt to guide the front, and hold on the casing, and also effect the explosion on the projectile striking the object aimed at.

[Printed, 1s. Drawings.]

A.D. 1863, February 21.—N° 474.

MANCEAUX, FRANÇOIS JULES.—"Improvements in fire-arms, "or in transforming arms of large calibre into arms of smaller calibre."

In order to enable barrels of small calibre to be fitted into stocks made for barrels of large calibre, strips of walnut or other wood or of leather are fitted into the stock and fastened with hot glue.

Muzzle-loading guns can be converted into breech-loaders. Other materials, such as gutta percha, card, or pasteboard, may be used instead of wood for filling strips.

[Printed, 10*d.* Drawing.]

A.D. 1863, February 21.—N^o 484.

WIARD, NORMAN. — (*Provisional protection refused.*) — “Improvements in ordnance and artillery, and means of operating “ and mounting the same, and in projectiles and instruments “ therefor.”

It is proposed to fix in the barrel of the gun at fixed distances bars of metal, which by their expansion will mark the degree of heat acquired by the gun from the combustion of the powder charge. Guns and mortars are to be made of three metals, steel, bronze, and lead. Projectiles are proposed to be made with enlarged rear ends, and with the centre of gravity thrown forward, and with concave fronts. Hollow projectiles are made with rounded fronts. Rifling grooves are proposed to be made “ with “ a flat surface, with square or rectangular edges or sides.” Other propositions are made relating to gun-carriages, vents, and sights.

[Printed, 10*d.* No Drawings.]

A.D. 1863, February 26.—N^o 547.

NODDER, RICHARD JOSEPH. — “Improvements applicable to “ hats, caps, helmets, military head-dresses, and other like cover- “ ings for the head.”

A zone or band formed of a kind of gauze, the upper portion of the warp being formed of thin metallic wires, is attached inside a hat, helmet, or cap in such a manner as to be adapted to the shape of the wearer's head. Holes are provided at or near the lower edge of the band to provide for ventilation. The band will “ protect the hat or other head covering from the grease “ thrown off from the head of the wearer.”

[Printed, 8*d.* Drawing.]

F. A.

8

A.D. 1863, March 2.—N° 581.

HAWKSLEY, GEORGE, and BISSELL, THOMAS. — “Improvements in powder chargers.”

The chargers of powder flasks are made of two tubes, one sliding in the other; the moveable tube is connected to a bar, and may be fixed by a set screw at any required point. The charger may be thus made to measure and deliver any required quantity of powder.

[Printed, 8d. Drawing.]

A.D. 1863, March 5.—N° 628.

CLARK, WILLIAM.—(*A communication from Alexandre Guerriero.*)—“Improvements in fire-arms.”

A revolver pistol is made with a barrel that is “slightly rifled” and slides on a rod or axis at the under part, to which it is fixed “by means of an eccentric.” The rotating charge chamber is partially fitted in a case enclosing its rear end. The butt is made of a single piece of forged iron. The pistol is so constructed that it may be readily separated into four principal parts.

[Printed, 1s. Drawings.]

A.D. 1863, March 12.—N° 677.

CLARK, WILLIAM.—(*A communication from Charles Auguste Cancalon.*)—“Improvements in breach-loading fire-arms.”

“The moveable breach is hinged to the end of the barrel, and is “fixed in position by a locking lever. There is also a self-acting “cartridge extractor, which withdraws the cartridge every time the “breach is opened by turning on its hinge joint.” Central-fire cartridges are employed, and the cartridge is exploded by means of a sliding striker actuated by a coiled spring placed in a slanting direction, so that a blow from the hammer drives the striker directly against the cap inserted in the cartridge.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, March 12.—N° 678.

LOMAS, EDWARD HENRY.—“Improvements in the action of “charger or measure for powder flasks, canisters, or other “vessels.”

Within the charger or measure are two discs, one fixed and the other moveable. By turning the moveable disc one way apertures made in it are caused to correspond with similar apertures made in the fixed disc, and so the powder is allowed to pass through. The disc being turned the other way closes the apertures. The disc is turned by a central pin which may be moved by the pressure of a spring.

[Printed, 8d. Drawing.]

A.D. 1863, March 16.—N° 705.

BELEY, GEORGE PARSONS.—(*Provisional protection only.*)—"Improvements in discharging projectiles below the water line of navigable vessels and other structures."

The port under water is to be closed by a door flush with the side of the vessel, and also by internal doors. When a gun or rocket is intended to be fired, a tube of iron closed at the outer end is pushed forward and fitted in the outer port. The tube of iron, when the gun is fired, is blown out, and the recoil of the gun allows the doors to close.

[Printed, 4d. No Drawings.]

A.D. 1863, March 20.—N° 750.

PRYSE, CHARLES, and KIRKWOOD, DAVID.—"Improvements in breech-loading fire-arms, part of which improvements are also applicable to other descriptions of fire-arms."

At the breech end of the barrel a charge chamber is formed, which is closed by a hinged cap working on either side, or by preference on the top of the chamber. The cap is raised by a lever "working on a pin passing through the cap, and upon which pin is fixed a cam or eccentric turning with the action of the lever. Upon the inside of the cap is fixed a plug or breech piece intended to force the cartridge into the barrel, so that when charged, the cap down, and the lever turned into a line parallel with the barrel, the longer axis of the cam or eccentric is also in a line with the barrel, and a rise or projection, which is formed upon its lower part, being brought under the projection in the rear of the charging chamber, the whole of the parts are thereby securely locked together." The end of the plug may be furnished with washers to make a gas-tight joint. Where a nipple with a large aperture is used, a valve is "placed in a counter sinking at the lower end of the nipple" to

prevent "back fire" from escaping. The valve may be a ball or a piston valve, or otherwise constructed.

[Printed, 10d. Drawing.]

A.D. 1863, March 26.—N° 787.

CHRISTOFLEAU, LOUIS.—"Improvements in fire-arms."

In place of the ordinary trigger a pin or stud working on the top of the stock is used to discharge the piece. The pin does not project and is covered with a sliding piece, so that the possibility of accidental discharge is obviated. The system of construction may be used for both single and double barrel guns

[Printed, 8d. Drawing.]

A.D. 1863, March 26.—N° 797.

NORTON, JOHN.—"Improvements in projectiles or ignition missiles."

A shell, made of any suitable figure, "is charged with liquid phosphorus," prepared by "dissolving phosphorus in a suitable quantity of the bisulphide of carbon, and to this solution may be added benzole, to increase the inflammability of the solution. The front or rear end of the shell may be provided with a plug or striker, so as to open a communication with the phosphorus when the shell is fired, when the liquid phosphorus "slowly escapes from the aperture and ignites on coming in contact with the atmosphere." Small charges of powder may be used, so that the shell may reach and fall in contact with the object it is desired to set on fire. Larger charges are used where penetration is to be effected.

In some cases the phosphorus is enclosed in metallic tubes, like those used for containing colours; in others a case is made by moulding paper, gutta percha, or other material into the required shape. "The phosphorus may be softened, if necessary, prior to putting it into the case, by immersing it in luke-warm water, and drying it before placing it in the case."

[Printed, 8d. Drawing.]

A.D. 1863, April 7.—N° 881.

NEWTON, ALFRED VINCENT.—(*A communication from Isaac Pettingill Tice.*)—"Improvements in projectiles for ordnance and in fuzes therefor."

Explosive projectiles are charged with fulminates of silver or mercury, or other fulminates, mixed with or interposed between cotton, gun-cotton, hair, or fibrous materials to prevent premature ignition from accident.

The charge chamber of the projectile may be lined with woollen or other cloth or soft material "for the same purpose." Metallic packing is used with the projectile to give it rotation. Percussion fuses are made by putting fulminates in one division of a tube, while sand, emery, or other substances are placed in another division; the substances are separated by a division, which is ruptured when the charge is fired.

[Printed, 8d. Drawing.]

A.D. 1863, April 9.—N° 902.

NEWTON, ALFRED VINCENT.—(*A communication from James Cameron Campbell.*)—"An improved construction of offensive weapon."

A "revolving many-chambered cylinder" is attached to a lance in such a manner that while the lance is held the barrels of the cylinder may be discharged. A spike is fitted to the butt of the weapon to enable it to be stuck upright in the ground.

[Printed, 8d. Drawing.]

A.D. 1863, April 15.—N° 949.

SPENCE, WILLIAM.—(*A communication from Samuel Ricker.*)—"Improvements in the manufacture of gunpowder."

Two parts by weight of charcoal are boiled in 38 parts of water. 20 parts of chlorate of potash are added, with 6 parts of a mixture composed of 2 parts of pulverized coal and 3 to 4 parts of "bi-carbonate of soda, or nitrate of lead or saltpetre, or their chemical equivalents." The composition is boiled, and 7 parts of pulverized bark or sawdust are added, and the boiling is continued. The composition is evaporated, and dried and granulated. The proportions may be varied to produce different qualities of powder.

[Printed, 4d. No Drawings.]

A.D. 1863, April 16.—N° 954.

WATTS, JOHN BURCHLEY.—(*Provisional protection only.*)—"An improvement in steel sword hilts."

In making steel sword hilts, the part known as "the oval centre" is to be made of "a separate piece of any suitable metal," by preference of malleable cast iron. The metal of the hilt, where the oval centre requires to be situated, is removed and the separate piece is rivetted or soldered, or otherwise fixed in its place.

[Printed, 4d. No Drawings.]

A.D. 1863, April 16.—N° 958.

MOULTON, STEPHEN.—(*Provisional protection only.*)—"Improvements in apparatus or means for lessening the recoil of cannon."

A break is proposed to be applied to the wheels or axle of the gun-carriage. A central shaft is to be passed through "the cheeks of the gun-carriage to which is attached a lever acting upon two clamps, which clutch a drum or roller fixed to each axle of the carriage wheels." Elastic rings of india-rubber may be connected with the tackle that holds the gun-carriage.

[Printed, 4d. No Drawings.]

A.D. 1863, April 24.—N° 1023.

THOMPSON, JAMES.—"Improvements in the manufacture of barrels for fire-arms and other descriptions of tubes, and in apparatus or machinery to be employed for that purpose."

Barrels for fire-arms are made "without weld or joint and with a solid breech" by passing through rolls "a thick solid tube of metal, with a hole punched through it for the formation of such tubes." The rolls are provided with "a double collar in one or both sides of the groove, or with a collar and a bearing." The groove in the rolls is made of the shape required to produce the barrel with the lump upon it, and has a stop piece to regulate the length and position of the barrel.

[Printed, 8d. Drawing.]

A.D. 1863, April 25.—N° 1043.

NEWTON, ALFRED VINCENT.—(*A communication from Louis Therasson.*)—"Improvements in breech-loading fire-arms."

A tubular chamber, with a curved upper surface corresponding in form to the stock, is screwed to the open breech end of the barrel, and an opening is made in the top to admit the cartridge. A sliding plug called "a follower" is made to work in the chamber by means of a lever handle fitted on the top of the stock. To the front of the sliding plug are attached discs of metal fitted with elastic packing of india-rubber. The pin is locked in its place, when it is pushed home, by a bolt so connected with the trigger that the charge cannot be fired unless the plug is in its proper place.

[Printed, 8d. Drawing.]

A.D. 1863, April 27.—N^o 1051.

RICHARDS, WESTLEY.—(*Provisional protection only*).—"Improvements in ordnance fire-arms and cartridges."

In constructing ordnance it is proposed to employ an inner tube "of steel or iron faced interiorly with steel," and to shrink or force on the tube exterior rings or hoops. The inner tube is "split from end to end," by preference in a line following "one of the grooves of the rifling." The inner tube is allowed to expand, "and nearly the whole strain of the explosion will fall on the exterior rings."

For a fowling-piece the barrel may be made of a thin steel tube cased or hooped at its breech end with a band of iron lapped round it.

In making a cartridge a wad, saturated with a lubricant, and having a small hole through it, is placed at the back of the cartridge, and a copper tube or long capsule is passed through it, and is charged with fulminating material. A pin is passed through the back of the cartridge, and is made to rest on the capsule in such a manner that when struck by the hammer it explodes the cartridge.

[Printed, 4d. No Drawings.]

A.D. 1863, April 28.—N^o 1062.

HALL, GEORGE, and WELLS, JOSIAH.—"A new explosive compound applicable for all the purposes for which gunpowder is or may be used."

An explosive compound is made by mixing "47 parts of chlorate of potassa, 38 parts of ferrocyanide of potassium,

"together with about 5 parts of sulphur or other chemical equivalent." Refined sugar may be employed. The ingredients are pulverized and mixed in water, or water and nitric acid.

The mixture is allowed to stand, and the water to evaporate. "10 parts of caoutchouc, or caoutchouc slightly incorporated with bisulphide of carbon," are added. The ingredients are well mixed, pressed, and granulated if required.

[Printed, 4d. No Drawings.]

A.D. 1863, April 29.—N° 1081.

WORMS, HENRY.—"Improvements in apparatus for elevating guns."

"Two toothed sector racks are used, which slide in guides below the rear end of the gun," and are connected by an axis on which is a roller used for supporting the breech of the gun. Motion is given to the toothed racks by toothed wheels turned by pinions worked by crank handles.

The gun is elevated by turning the handles, and the degree of elevation is measured and regulated by means of graduated ratchet discs or plates.

[Printed, 8d. Drawing.]

A.D. 1863, May 2.—N° 1100.

BISSELL, TITUS LUCRETIVS.—(*Provisional protection only*).—

"An improved apparatus for charging breech-loading cartridges."

The cartridge case is proposed to be charged "in a hollow fixed tube," supported in a suitable frame. A second hollow tube is made to slide in the fixed tube, and is divided into two parts, through one of which the powder, and through the other the shot, is fed into the cartridge. To the frame is attached a small vertical spindle "carrying a hollow inverted cap," and turned by a winch handle, by means of which the edge of the cartridge case is turned over.

[Printed, 4d. No Drawings.]

A.D. 1863, May 2.—N° 1104.

PURDEY, JAMES.—"Improvements in breech-loading fire-arms."

The barrels are "tilted" or turned down to receive the charge in their exposed rear ends. When the barrels are in their place they are locked by "a locking bolt forming part of a sliding bar working through the body of the action." The bolt "enters two slots or notches in the steel lump on the under side of the barrels." It is worked by a lever which fits against the trigger guard. The bolt and the end of the lump are both bevelled, so as to cause the bolt to work easily and lock the barrels tightly.

[Printed, 10d. Drawing.]

A.D. 1863, May 7.—No 1139.

SNIDER, JACOB, junior.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms and ordnance."

The improvements are stated to be based on those for which prior Letters Patent were granted, respectively dated April 1, 1857, No 907, and November 29, 1860, No 2933. They relate to a method of locking the moveable breech chamber by means of a "self-acting latch bolt, centred in such a manner that the bolt takes into an aperture, provided for its reception, so soon as the breech piece is pressed down by hand." The hammer, "in falling and striking the nipple, comes so near to one end of the lever to which the latch bolt is attached as to prevent the bolt leaving the aperture into which it entered when the breech was closed." The breech is unlocked by pressing a button on the lever attached to the bolt. The fire communication is made central to the charge chamber." The hinge and breech piece are made in one piece; the hole for the hinge pin is oval. An aperture is "formed on the under surface of the breech, closed by a screw, for the introduction of lubricating material."

[Printed, 4d. No Drawings.]

A.D. 1863, May 12.—No 1187.

LILLY, BENJAMIN.—"Improvements in the construction of 'snap-caps' or 'nipple protectors' for fire-arms."

The-snap cap is made with top and bottom chambers or sockets of suitable depths, "so that the leather or other pad on which the hammer falls can be securely fastened in the one, and a metal washer fitting the square of the nipple be loosely secured in the other, while facility is afforded for the introduction of a soft

"metal washer in conjunction with the pad in the top chamber" or socket. The snap-cap may be rotated on the gun nipple, so that the hammer may strike evenly at whatever angle the nipple may be set.

[Printed, 8d. Drawing.]

A.D. 1863, May 15.—N° 1221.

FYFE, DOUGLAS MONRO. — (*Provisional protection only.*)—

"Improvements in the brushes, instruments, or apparatus employed for painting the centres and bull's-eyes of military or other targets."

The brush employed for painting the centres and bull's-eyes of targets is to be mounted on an axis, round which it can be readily moved. The breadth of the brush is made equal to the radius of the bull's-eye required to be painted on the target.

[Printed, 4d. No Drawings.]

A.D. 1863, May 15.—N° 1222.

FYFE, DOUGLAS MONRO.—"Improvements in the means or apparatus employed for raising, removing, transporting, and re-fixing military or other targets or mantlets."

The target or mantlet is mounted on a frame carried on wheels, to enable it to be easily moved from place to place. The target or mantlet is raised or lowered upon the frame by means of toothed sectors, moved by suitable pinions worked by an axle and winch handle.

[Printed, 10d. Drawing.]

A.D. 1863, May 15.—N° 1223.

CLARK, WILLIAM. — (*A communication from Oliver Fisher Winchester.*)—"Improvements in repeating fire-arms."

Cartridges containing their own ignition are carried in a tubular magazine, placed below and parallel to the barrel. The cartridges "are carried up from the mouth of the magazine to a position in rear of the barrel by a carrier block working vertically within a mortice, in the frame of the arm, and are afterwards pushed into the barrel by means of a sliding breech pin;" the block and pin are "operated by means of a lever arranged under the stock." In connexion with the sliding pin is a plunger,

which passes through the breech and has an independent "longitudinal motion," by means of which it effects the explosion of the cap, upon being struck by the hammer. A "rest" is employed in connexion with the sliding pin and plunger to support the cartridges. There is a "spring catch for taking hold of them" at the top to withdraw the discharged cartridge case; the carrier block then rising strikes its front end and "tips it over in a backward direction."

[Printed, 8d. Drawing.]

A.D. 1863, May 19.—N° 1251.

JOHNSON, JOHN HENRY.—(*A communication from Anthony Pollak.*)—"Improvements in breech-loading fire-arms."

Revolving fire-arms are made with a breech cylinder shorter than the metallic cartridge used with it; it has backward and forward motion as well as a rotating motion. The lock and the cylinder are made to slide together in a recess in the stock protected by a "lock case." The cartridge is fired "by the percussion of a pin," acting within the lock case. The motions are given to the cylinder by the action of the lock.

For breech-loading fire-arms a breech pin sliding in a recess in the stock is used. It is connected with the lock, which also slides in the recess, and is "provided with a breech block, recessed in front to receive the flanged end of the cartridge." A hook, "pivoted by a friction joint to the breech block," grasps the flange of the cartridge case when the hammer falls, and is made to extract the discharged cartridge case. The sliding breech pin is actuated by a hollow guide bolt connected with the main spring.

[Printed, 1s. Drawing.]

A.D. 1863, May 21.—N° 1274.

HUGHES, EDWARD THOMAS.—(*A communication from Rudolph Mayer.*)—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, and in cartridges connected with the same."

The barrel of the fire-arm is to be attached "solidly to the breech by means of screws," or other suitable means. In the rear of the barrel, and in a line with it, is "a rocking conduit or

"feeder hung on a centre." The feeder is tilted downwards to allow the piece to be charged, and is then raised and closes the breech of the barrel. Cartridges containing their own ignition are used, and are fired by a hammer or needle placed below the barrel.

[Printed, 4d. No Drawings.]

A.D. 1863, May 21.—N^o 1281.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Lewis Wells Broadwell.*)—"Improvements in breech-loading ordnance, and breech-loading and other small arms."

A horizontal opening is made in the breech end of the gun, at right angles to the axis of the bore. A sliding block is made to fit the opening; the block has a hole through it, corresponding with the bore, through which the charge is inserted. A hole is also made in the rear end of the gun, either coinciding with the bore or below it. In the latter case a bolt is made to fit centrally in the sliding block, when it closes the breech. A gas-tight breech joint is made by inserting in the rear of the barrel a ring or washer of elastic material.

A breech-loading musket is made by cutting a transverse opening in the breech end of the barrel, and causing a block to slide in it by means of a quick threaded screw. A tubular magazine is formed in the hammer, containing self-acting feeding apparatus for supplying ignition wafers or patches to the nipple.

[Printed, 2s. 2d. Drawings.]

A.D. 1863, May 22.—N^o 1283.

MASCHWITZ, CHARLES.—(*A communication from Ferdinand Krauskopf.*)—(*Provisional protection only.*)—"Improvements in stoppers or bungs for closing or stopping bottles, jars, and other vessels, and the muzzles of rifles, and for other like purposes."

A stopper, suitable for closing the muzzle of a rifle, is proposed to be made of india-rubber vulcanised. The stopper is made slightly conical; it has a central stem or axis, which when pushed down elongates the stopper, and lessens its diameter. The stopper may be readily released from the muzzle by pressing down the stem; at other times it swells and tightly closes the muzzle.

[Printed, 4d. No Drawings.]

A.D. 1863, May 22.—N° 1284.

BLAKELY, THEOPHILUS ALEXANDER.—“Improvements in
“ordnance.”

Guns are made of an inner tube of brass or other alloy of copper, with a jacket of steel made in one or more pieces. The barrel of the gun may also be made with an “inner tube of mild steel,” having outer tubes of harder steel shrunk on, “the steel “being increased in hardness the farther it is removed from the “centre.” Each successive jacket or tube is made with its inside smaller than the outside of the tube on which it is shrunk, care being taken that the differences between the diameters is such, that, when the gun is fired, “the strain shall be distributed “throughout the whole thickness of the gun.” The rule adopted for carrying this into effect, is “to calculate that the extension of “the outside of any tube is less than the extension of its inside “when strained from within, in proportion of the square of the “outer diameter to nine-tenths of the square of the inner “diameter.”

[Printed, 4d. No Drawings.]

A.D. 1863, May 22.—N° 1286.

BLAKELY, THEOPHILUS ALEXANDER.—“A new method of
“rifling guns, and of forming projectiles to correspond there-
“with.”

Guns are rifled by forming the bore in section of an irregular curvilinear shape. It is first decided “at what distance from the “centre of the projectile the turning force shall act; the smaller “the bore the nearer the centre should this force act.” A circle is drawn from a centre in the axis of the piece at this fixed distance, and the piece is then rifled with “rifling of such a shape “that a line perpendicular to any point of its surface shall also “be a tangent to this circle.” The projectile is formed of corresponding shape to fit the bore.

[Printed, 6d. Drawing.]

A.D. 1863, May 23.—N° 1297.

BICKFORD, JOHN SOLOMON, and SMITH, GEORGE.—“A
“certain new manufacture for firing explosive compounds.”

"Strands of flax or yarns" are twisted or plaited round a central strand or inflammable yarn made of gun cotton, which is used in place of the column of gunpowder ordinarily used in a "Bickford's" miner's fuse. The strand of gun cotton may be specially prepared by soaking it for about an hour in dilute silicate of potash, after which it is washed in pure water and dried.

[Printed, 4d. No Drawings.]

A.D. 1863, May 27.—N° 1329.

CLARK, WILLIAM.—(*A communication from Célestin Dumonthier.*)—(*Provisional protection only.*)—"Improvements in offensive and defensive arms."

A dagger knife is proposed to be applied to the barrel of a pistol or other fire-arm, so as to form part of it. The dagger or knife is forged with the barrel, which "forms the back of the knife."

[Printed, 4d. No Drawings.]

A.D. 1863, May 27.—N° 1334.

PALLISER, WILLIAM.—"Improvements in projectiles for ordnance."

Cast-iron projectiles are chilled "either wholly or partially, of whatever form they may be constructed. For example, the entire mass of iron composing the projectile may be of chilled cast iron, or the face or striking portion only may be chilled." The projectile may be chilled internally.

Cast steel is cast "in chill for use as a projectile, also any mixture of wrought iron and cast iron, copper and cast iron, or other alloy of cast iron, such mixtures or alloys being cast in chill and used for projectiles." Various forms of projectiles may be used; one with "a long conical head" is found "in practice a favourable form." Projectiles having chisel-edge fronts are used. Copper studs are attached to projectiles by fixing them in the mould in which the projectile is cast.

For a "mechanically fitting rifle gun" a copper jacket is cast "upon the shot."

[Printed, 6d. Drawing.]

A.D. 1863, May 30.—N° 1360.

BAKER, VALENTINE.—“Improvements in ordnance.”

The outer portion or casing of the gun is made by coiling or rolling up a sheet of metal upon itself, the roll or coil being “submitted to a soldering process;” or the coils or laps may be welded.

Sheets of iron or steel, alone or combined with sheets of brass or other metal, may be used. The sheets may be made to form an internal tube, and be inserted in a cast-iron gun.

[Printed, 8d. Drawing.]

A.D. 1863, June 15.—N° 1500.

STAFFORD, PATRICK PLUNKETT LESLIE.—(*Provisional protection only*).—“Improvements in fire-arms.”

A hinged charge chamber is to be attached to the rear end of the barrel of the gun. The barrel has a sliding motion, and a shoulder on the breech-piece fits into a recess in the rear of the barrel. The barrel is held to the stock by split rings or bands, which are elastic. The ignition is effected by a sliding striker, which fires a percussion tube attached to the cartridge.

[Printed, 4d. No Drawings.]

A.D. 1863, June 18.—N° 1525.

GANNE, JULES LOUIS.—“Improvements in toy pistols.”

The barrel of the pistol is moveable, and may be concealed or carried in the butt end. The length of the pistol is thereby shortened, and it is made more portable.

[Printed, 10d. Drawings.]

A.D. 1863, June 19.—N° 1535.

MARRISON, ROBERT.—(*Provisional protection only*).—“Improvements in breech-loading fire-arms.”

The barrel is to be made to have a combined forward and side motion. The breech plate has “circular metal projections” upon it, which take into the rear of the barrel, and make a gas-tight joint. The barrel is moved from the breech plate and turned on one side to receive the charge.

[Printed, 4d. No Drawings.]

“ deck or floor to part of the frame revolving in the case
 “ above the water line, for the purpose of loading one of two,
 “ three, or more guns which are supported upon blocks or
 “ carriages on opposite sides of the frame; and capable of being
 “ protruded from the frame and through an aperture in the side of
 “ the water case and side of the vessel or fort for the purpose
 “ of being discharged under water. Water has free egress in and
 “ around the apparatus, but when the guns are not required to be
 “ used the water may be kept out by an ordinary port, valve, or
 “ shutter.”

In working the apparatus one gun is under water, and the opposite gun above the water line, and in a position for being loaded and primed from the deck inboard or from the floor of the fort. After being loaded a parchment or other suitable cap is placed over the muzzle of the gun to prevent the water entering before the gun is discharged. “ I prefer to effect the discharge by electricity or galvanism in the manner well known. After the discharge the recoil drives the gun inwards in the apparatus, and causes the frame to rotate and partially to bring the gun, which had been loaded, into position for being fired.” The gun is prevented from running out again by a chain windlass and pawl. The exact position of the frame for loading one and discharging the other gun is obtained by means of a toothed pinion.

[Printed, 1s. 8d. Drawings.]

A.D. 1863, July 3.—N° 1653.

BROADHEAD, HENRY, and MURDOCH, GEORGE.—“ Improvements in breech-loading ordnance and gun carriages.”

The gun is bored through and the breech is closed by a screwed plug having part of the screw cut away, so that when the plug is inserted in the breech the male and female screws are engaged by a partial turn of the plug. The gun carriage consists of a frame mounted on wheels, so that a heavy gun is turned more readily than when mounted on a pivot.

[Printed, 1s. 10d. Drawings.]

A.D. 1863, July 8.—N° 1696.

GIBSON, JOHN, TRULOCK, SAMUEL, TRULOCK, RICHARD, and TRULOCK, WILLIAM.—(*Provisional protection only.*)—“ Improvements in breech-loading fire-arms.”

The barrels are constructed on the "Lefauchaux" plan, and are "tilted" to receive the cartridge in the breech. Underneath the barrel it is proposed to fix a notched piece of iron, acting as a locking bolt, so as to secure the barrels in their place. By turning a lever handle the barrels are released and allowed to turn down.

[Printed, 8d. Drawing.]

A.D. 1863, July 8.—N^o 1703.

CUNNINGHAM, HENY DUNCAN PRESTON.—(*Provisional protection only.*)—"Improvements in working guns and in matters relating thereto."

It is proposed to make the gun carriage in two parts, the upper one turning on the lower one, so that the gun can be turned completely round, so as to allow it to be loaded by persons stationed behind it. The port-holes are to be closed by moveable sliding slabs or bars that may be readily raised or lowered.

[Printed, 4d. No Drawings.]

A.D. 1863, July 11.—N^o 1738.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Alfred Isidore Honoré Parent.*)—"Improvements in cartridges for breech-loading arms."

The pin striker of the ordinary pin cartridge is made with an enlarged part, which, when the pin is struck, is forced into the orifice through which the pin works, and completely closes it so as to prevent escape of gas. The metal socket of the cartridge is "secured to the moveable paper or pasteboard case" by "riveting or burring" it. The metal socket is made by first punching out a plain disc of metal, and then by "top and bottom punches," stamping "the socket into the required form."

[Printed, 8d. Drawing.]

A.D. 1863, July 13.—N^o 1752.

BONNEVILLE, HENRI ADRIEN.—(*A communication from Adolphe Jean Victor Marcet.*)—"Improvements in certain descriptions of breech-loading fire-arms."

The barrel is "tilted" or turned down to receive the charge in

the breech. A hooked piece worked by a lever below the barrel is engaged in a notched projection attached to the barrel when the barrels are in their place ready to be discharged. The cartridges contain their own means of ignition, and are fired by a needle made to pierce them from below. The needle is urged by a spring which is compressed by the act of shutting down the barrels, and is released by pulling a trigger.

[Printed, 8d. Drawing.]

A.D. 1863, July 14.—No 1755.

COOPER, JOSEPH ROCK.—(*Provisional protection only.*)—"Improvements in sights for rifles and other fire-arms."

Sights are proposed to be fixed at the side instead of upon the top of the barrel. The front sight may be moved by a screw and rack, and be made the moveable sight, the back sight being fixed. Or a series of moveable sights may be employed, each being arranged for a given required distance.

[Printed, 4d. No Drawings.]

A.D. 1863, July 16.—No 1782.

ELLIOTT, HENRY.—"Improvements in breech-loading fire-arms."

The barrels are turned down on a hinged joint to receive the charge in the breech. The locking arrangement consists of a hooked lever working in a vertical plane behind the breech end of the barrels. When the barrels are closed the hooked end of the lever is pushed by a spring into a recess in the rear of the barrels "under the top rib and between the barrels." The lower end of the lever projects below the stock in front of the trigger guard. By pressing the thumb on the lower end of the lever the barrels are released.

[Printed, 1s. Drawings.]

A.D. 1863, July 18.—No 1805.

HOLBOROW, ETHELBERT, and PARKER, ISAAC.—(*Provisional protection only.*)—"Improvements in the construction of sights for fire-arms."

A "plumb line or pendulum" is to be attached to the sight of a rifle gun, so that the marksman may know whether the sight is

perpendicular. "To the upper part of the sight a weighted bar is "suspended so as to move freely on its axis." In this bar a slot is formed "to correspond with the slot" or notch in the sight."

[Printed, 4d. No Drawings.]

A.D. 1863, July 22.—N° 1838.

PERRIN, ISAAC.—(*Provisional protection only.*)—"An improved "danger signal to be used on rifle, artillery, and other practising "grounds."

A self-acting danger signal is to be attached to the mantelet, where the marker is stationed. The signal is mounted on the top of a pole, to which are attached cross arms so placed that the marker on issuing from the mantelet must push them aside, and so indicate by the top signal that it is dangerous to fire.

[Printed, 4d. No Drawings.]

A.D. 1863, July 23.—N° 1843.

SOUL, MATTHEW AUGUSTUS.—(*A communication from John Palmer.*)—"Improvements in expelling solid and liquid refuse "matter from steam and sailing ships below the water line, "applicable also for discharging cannon below water from ships "and forts, and in part for charging gas retorts and iron furnaces, "and for other similar useful purposes."

Water-tight tubes provided with suitable valves or covers are fixed in the side of a ship. Substances which are required to be discharged into the sea are placed in the tube, and compressed air is then introduced; the outer valve is then opened, and the contents of the tube discharged into the sea.

A smaller tube or channel is used for enabling guns to be fired below the water. The muzzle of the gun works in a stuffing box. Similar tubes and valves are employed for discharging guns from submarine forts by galvanic agency.

[Printed, 1s. Drawing.]

A.D. 1863, July 23.—N° 1844.

DAVIES, GEORGE.—(*A communication from Christian Sharps.*)—"An improvement in revolving fire-arms."

A rotating breech block or charge cylinder is combined "with "a detachable cap, the latter being so adapted to the former that,

" when the two are fitted together, they shall become temporarily
 " a portion of each other, the cap being incapable of yielding to
 " the re-action caused by the explosion of the cartridge, as in
 " other blocks made of detachable pieces, which separate when
 " the discharge takes place." One piece is then " driven hard
 " against one side, and the other portion against the opposite side
 " of the frame," and the block becomes jammed. Metallic
 cartridges are used, and when the chambers are charged, the cap
 is fixed in its place behind them by a screw fastening.

[Printed, 8d. Drawing.]

A.D. 1863, July 23.—N° 1847.

HORTON, WILLIAM.—(*Provisional protection only.*)—" Improvements in fire-arms."

The barrels are hinged to the stock, and are to be locked by a piece of metal that enters into lugs formed on the under side of the barrels. The piece of metal is moved by a hand-lever.

[Printed, 4d. No Drawings.]

A.D. 1863, July 25.—N° 1859.

TOLHAUSEN, FREDERICK.—(*A communication from Maurice Mondon.*)—" Improvements in the manufacture of gun barrels."

A " blank tube " is prepared by hammering or rolling it, and is then passed through rollers in such a manner that " whilst it is
 " being rolled a rotatory motion is given to it," by which " a spiral
 " welding motion is produced, in such a manner as to join the
 " fibres or stripes of the iron transversely." The transverse or
 " reciprocating motion is obtained by a rack, placed horizontally
 " at right angles with the axis of the rollers; the rack carries a
 " pair of pincers for holding the barrel, and is driven forward
 " and backward by means of a pinion, with suitable reversing
 " gear." The rotatory motion is " independent of the traverse
 " motion;" it is obtained by means of two bevel wheels, one of the
 latter being keyed on a square hollow hub, about the pinion, thereby allowing the barrel to be twisted, without interfering with the rack motion.

[Printed, 8d. Drawing.]

A.D. 1863, July 27.—N° 1862.

TRANTER, WILLIAM.—" Improvements in breech-loading and
 " other revolving fire-arms."

A plunger is used "for forcing out the empty cartridge case" from the chamber of the rotating cylinder of the revolver. The plunger is "worked by a lever, having its fulcrum on the upper part of the frame" of the revolver. The shield at the back of the revolving cylinder is made with "a hole for the insertion of the cartridge in the chamber, which hole is closed, after loading, by means of a stud fixed on a plate, working on a pin screwed into the frame, the plate being retained in its position by a click or other means." The butt cap has two "segmental projections" or studs, which are "driven into the ends of the stocks," so as to fix the stocks to the handles. To the front part of the cock is applied "a spring click, working in combination with the lever, for retaining the revolving chamber as required." The lever has a projection capable of being acted upon by the click.

[Printed, 8d. Drawing.]

A.D. 1863, July 29.—N° 1881.

NEWTON, WILLIAM EDWARD.—(*A communication from Silas Crispin.*)—"Improvements in cartridges."

In order to prevent the escape of the gases of combustion, the cartridge case is "formed of thin wrapped sheet metal alone, or thin sheet metal and paper wrapped and alone, and in each case the metal or metal and paper being wrapped so as to extend around the circle at least beyond the point of starting of the wrapped metal or metal and paper, so that the lap will permit the necessary expansion of the cartridge case, incidental to the explosion, and still preserve the integrity of the metallic or metallic and paper cartridge case, which cartridge case will thus pack the joint in the arm; or each and all these varieties of cartridge may be combined with, and supported by, an internal or external disc secured to their bases; or each and all of the foregoing varieties of cartridge cases combined with a metallic primed cup or cap (both being united securely together), and constituting a primed metallic cartridge case." Thin sheets of brass or other suitable metal, annealed or not, are cut into a suitable trapezoidal or rectangular shape, by hand or by machinery, and are rolled with overlapping edges upon a "former;" the edges are "crimped" or turned in and forced into a suitable die. Envelopes or linings of paper are used, and a cup of metal or

paper may be inserted in the bottom of the cartridge case or attached outside. Flanged discs may be attached by solder or otherwise to the bottom of the cartridge.

[Printed, 10*d.* Drawing.]

A.D. 1863, July 30.—N^o 1887.

HOWELL, JOSEPH BENNETT.—(*Provisional protection only.*)—

“Improvements in ordnance, fire-arms and projectiles.”

Projections or ribs are proposed to be made within the bore of the gun. Annular grooves are to be formed on the projectile, so that “the projectile as it is expelled from the gun shall receive the requisite axial motion.”

[Printed, 4*d.* No Drawings.]

A.D. 1863, July 31.—N^o 1894.

HADDAN, JOHN COOPE.—(*Provisional protection only.*)—“Im-

“provements in fire-arms and in artillery and projectiles for the same.”

Fire-arms and artillery are proposed to be rifled “by cutting away the whole or nearly the whole of the circumference of the cylindrical bore, so as to produce in transverse section the form that would result from rounding off or filling up the angles of a geometrical plane figure of three or more sides, the sides being straight or very slightly convex, or concave curves.” Soft metal or expanding projectiles are to be used, or those having backs or coats of soft metal. For cannon of steel or forged metal the trunnions are forged “of a diameter about equal to the external diameter of the cannon at the trunnions” and of “comparatively narrow width.” Projectiles intended to be used with oval-bore guns are made of such a shape that there is an extended surface in contact with the bore instead of a linear contact. The surfaces of the projectiles may be coated with zinc or copper.

[Printed, 4*d.* No Drawings.]

A.D. 1863, August 3.—N^o 1913.

FIELD, JOHN WILLIAM PARKER.—“Improvements in the manufacture of sheaths or cases for staves or other similar weapons.”

The case is made of leather or other suitable material, and in the bottom is fixed a spiral spring. When the weapon is put in the

case it is pressed down and held in its place by the lid or cover of the case. When the lid is raised the reaction of the spring causes the weapon to rise from its case ready for use.

[Printed, 8d. Drawing.]

A.D. 1863, August 4.—N° 1923.

WALSH, JOHN HENRY.—“Improvements in breech-loading fire-arms, and in the means of extracting cartridge cases therefrom.”

A false breech “carrying the lock plate and working parts of the lock” is connected by a hinge to the barrel, and is opened out sideways to allow the charge to be inserted in the rear end of the barrel. When the breech piece is in its place it is locked by means of projections on a lever which is attached to it. When the lever is depressed by a thumb piece the breech piece is locked; when it is raised the breech piece is free to move open sideways, under the action of a spring. In order to enable the discharged cartridge case to be extracted a projection is formed on its lower rim, and it is extracted by a hook or a pin with an opening or loop formed on its end.

[Printed, 8d. Drawing.]

A.D. 1863, August 4.—N° 1925.

NEWTON, WILLIAM EDWARD.—(*A communication from Jean Simon Voruz.*)—“Improvements in machinery or apparatus for moulding and casting hollow projectiles.”

Cylindro-conical projectiles “having cast iron sockets” are cast in moulding apparatus, “so arranged that the sockets are obtained with a mathematical precision, and the casting is effected with as great facility and readiness as though the sockets were bored after casting.”

Two patterns are fixed in the frame, and the projections which form the sockets are moved by self-acting machinery, “which allows of the prints for the sockets being made simultaneously to project from or enter the model, according to the requirements of the moulding.” The movement is “effected by means of a vertical shaft placed inside the model or pattern;” it is connected “by means of six horizontal connecting rods to the six prints for forming the recesses.”

[Printed, 10d. Drawing.]

A.D. 1863, August 10.—N° 1971.

CUNNACK, RICHARD JOHN.—(*Provisional protection only.*)—
 “Improvements in the manufacture of cartridges for blasting
 “and projectile purposes.”

The charges are to be “concentrated” by “exposing the explosive material of which they are composed to great pressure when making” the cartridges. The compressed charge is to be enclosed in a case of iron or lead or tin or other suitable metal or alloy. The explosive material may be mixed with “resinous, gummy, or other adhesive substances.”

[Printed, 4d. No Drawings.]

A.D. 1863, August 11.—N° 1985.

LILLIE, Sir JOHN SCOTT.—“An improved revolving battery.”

A cylinder is formed “of any required number of gun barrels of any calibre.” The barrels “may be muzzle-loaders, or open at both ends so as to be loaded at the breech.” When loaded the barrels are made to revolve by a winch which turns a spindle or central shaft, and also sets in motion the percussion apparatus.

With a battery of six barrels a twenty shot chamber or cylinder may be attached to each barrel, and caused to revolve so as to discharge 120 shots in a minute. The discharged chambers may be replaced by others ready loaded.

[Printed, 4d. No Drawings.]

A.D. 1863, August 13.—N° 2000.

EDMUNDS, JAMES.—“An improvement or improvements in
 “gun and pistol furniture.”

The furniture of guns and pistols is made of the alloy called aluminium bronze, cast in suitable moulds of a size larger than the finished articles. The parts are then forged in a cold state, and brought to the required size, and are then filed and finished. The alloy used is composed of $92\frac{1}{2}$ parts of copper and $7\frac{1}{2}$ parts of aluminium.

[Printed, 4d. No Drawings.]

A.D. 1863, August 13.—N° 2005.

DEANE, EDWARD.—(*Provisional protection refused.*)—“Improvements in artillery and fire-arms, and in projectiles for the same.”

The bore of the barrel is proposed to be made of a triangular form in section. Projectiles triangular in section with a sharp point are to be used.

[Printed, 4d. No Drawings.]

A.D. 1863, August 14.—N° 2016.

RUSSELL, NORMAN SCOTT.—“Improvements in apparatus for working great guns.”

Hydraulic or hydrostatic apparatus is applied directly, without the intervention of chains or tackle, to working great guns. For ships' guns the apparatus is made to work below the water line. Rams attached directly to the gun are worked in suitably arranged cylinders by the pressure of water, and raise or depress it at the breech or muzzle, or move it in any required direction.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, August 20.—N° 2072.

NEWTON, WILLIAM EDWARD.—(*A communication from Albert Hook.*)—“Improvements in the manufacture of cartridges.”

An annular recess or groove is formed “in the base or rear part of the bullet to receive the edge of the paper cartridge, which is held therein, by compressing the outside of the bullet until it nips and secures the paper.”

[Printed, 6d. Drawing.]

A.D. 1863, August 21.—N° 2081.

POPE, EDMOND.—“Improvements in breech-loading fire-arms.”

A chamber is formed in the rear of the barrel into which the cartridge is inserted. It is then pushed forward into the breech end of the barrel, and a closing bolt is pushed up behind it and closes the breech.

The cartridge used is a pin cartridge, and the pin projects through an opening in the upper part of the barrel, and is discharged by the hammer in the usual way.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, August 22.—N° 2084.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Joseph Sagnes.*)—“Improvements in closing powder canisters and other vessels.”

The "closing is effected by means of cross bars, which press upon a cover." There are hooks upon the cross bars and also on the rim of the canister. By turning a central spindle, by means of a moveable key, the hooks are engaged or disengaged, and the cover fastened down or released.

[Printed, 1s. Drawings.]

A.D. 1863, August 25.—N° 2100.

LEWIS, GEORGE EDWARD, WALKER, HENRY, and WAYNE, JOSEPH BLOUNT.—"Improvements in breech-loading fire-arms."

The barrels are tilted or turned down on a hinge to receive the charge in the breech. The barrels are "fixed down by means of sliding closers, which slide in the break-off in the line of the barrel; the ends of the said closers are flush with the face of the break-off when the breach ends of the barrels are raised." When the breech ends are depressed the closers are "made to advance from the break-off into the ends of the barrels" and lock them. Or the barrels are locked by means of "a spring bolt between the barrels, taking into a lump on the under side of the barrels." The bolt is worked by a horizontal axis and lever.

[Printed, 1s. 6d. Drawings.]

A.D. 1863, August 27.—N° 2120.

NEWTON, WILLIAM EDWARD.—(*A communication from Charles Coffey Alger.*)—"Improvements in breech-loading fire-arms."

The breech is closed by a breech piece which has "a swinging movement toward and from the barrel," and is connected with the hammer in such a way "that the hammer by the act of falling is caused to lock the breech securely against the rear end of the barrel, and to brace it" firmly. The act of drawing back the hammer to cock it unlocks the breech. The barrel is attached to the stock by a breech frame, having a cavity in which the breech and hammer work. When the hammer is raised to half cock the breech piece, which is then unlocked, is drawn back, the cartridge is then inserted, the breech piece pushed into its place, and the hammer raised to full cock. Cartridges which

contain fulminating composition in a metallic cap with an annular flange are used by preference. An extractor hook passing through the breech draws out the discharged cartridge.

[Printed, 8d. Drawing.]

A.D. 1863, August 27.—N° 2121.

RICHARDS, GEORGE. — (*Provisional protection only.*)—"Improvements in the construction of ordnance and fire-arms, and in the projectiles to be used therewith."

Projectiles of a smaller sectional area than that of the bore of the piece from which they are fired are proposed for use. A sabot is placed behind the projectile, which fills the bore. A hexagonal projectile is to be fired from a square bore. Other forms may be used.

[Printed, 4d. No Drawings.]

A.D. 1863, August 29.—N° 2139.

AGNEW, ARTHUR. — "Improvements in breech-loading fire-arms."

Barrels that are turned down on a joint to receive the charge are locked by means of a bolt made "to slide in the lower part of the break off," and to engage "in a recess in a lump on the under side of the breech ends of the barrels." The bolt is urged by a spring, and is bevelled at the end nearest the barrels. The bolt is released by means of a lever action fixed inside the trigger guard, and pressed forward towards its front part. When the barrels are shut down on the bevelled end of the bolt, they are locked by the action of the spring. To relieve the joint pin of the barrels from strain, when the piece is discharged, "the face of the lump furthest from the break-off" is made slightly concave, "and the face of the opening in the body of the break-off, into which the lump on the barrels enters," is made slightly convex, so that when the barrels are shut down, the concave face on the lump engages in and fits the "convex face of the opening in the body."

[Printed, 8d. Drawing.]

A.D. 1863, August 31.—N° 2147.

BRAENDLIN, FRANCIS AUGUSTUS. — "Improvements in breech-loading fire-arms."

Barrels that are turned down on a joint to receive the charge are made gas-tight at the breech by "hollowing out the break-off in a line with the axes of the barrels," so as to form "short annular chambers," in which are inserted "expanding rings or valves." The expanding rings are made either flush with the face of the break-off, or they project and fit into corresponding recesses in the ends of the barrels, to which a slight sliding motion is in that case given.

A spring bolt works through the break off, and engages in a recess in the breech chamber, or in a lump under the barrels. The bolt is released by "raising the finger plate" attached to a lever motion connected with the bolt. The finger plate is nearly flat, "and bears upon the tang of the break-off."

[Printed, 10d. Drawing.]

A.D. 1863, September 1.—N^o 2156.

SNIDER, JACOB, junior.—"Improvements in breech-loading and other ordnance, part of which is applicable to the utilizing old smooth-bore cannon, and in projectiles to be used therewith."

The gun is bored through, and the breech is closed by a hinged breech block fitting in an opening at the breech end of the gun. The breech block is turned up and on one side by a winch handle attached to the pin of the hinge on which it turns. A soft metal ring is fitted in the rear of the bore, so as to abut against the face of the breech block and make a gas-tight joint.

A muzzle-loading gun is converted into a breech-loader by cutting an opening in the breech end, and inserting in it a hinged breech block. A steel cylinder is introduced as a lining into the gun, so as to reduce the bore to the required size. Flanges or ribs of a form to fit the rifling are attached to elongated projectiles. The flanges may be made of the shape of ratchet teeth in section. Soft soap is used as lubricating material.

[Printed, 10d. Drawing.]

A.D. 1863, September 9.—N^o 2223.

THOMPSON, NATHAN. — "Improvements in apparatus for stopping bottles, jars, and other vessels, which improvements are also applicable to stopping the muzzles of fire-arms."

The stopper, which may be used for closing the muzzle of a musket barrel, consists of two discs connected by a spindle, having on one end a right-handed, and the other end a left-handed screw. By turning the spindle the two discs are made to approach or recede from one another, so as to compress or release an elastic ring made of vulcanised india-rubber, and so cause it to expand or contract. Or an expanding nut formed of radial pieces may be fitted in an elastic ring, and be made to expand or contract by turning a screwed spindle.

[Printed, 8d. Drawing.]

A.D. 1863, September 10.—N° 2230.

JORDAN, THOMAS BROWN.—(*Provisional protection only*).—

“Improvements in granulating and drying gunpowder, and in apparatus to be used therewith.”

The plastic powder is to be forced down through the perforated plate of a pug mill. The threads and powder paste as they protrude are cut off by revolving cutters in the form of grains; or the paste is pressed between two revolving cylinders, the outer one being perforated. The grains are received upon a travelling band and dried.

[Printed, 4d. No Drawings.]

A.D. 1863, September 10.—N° 2231.

GREENER, WILLIAM WELLINGTON.—“Improvements in breech-loading fire-arms.”

Barrels that are turned down on a joint to receive the charge are locked by a sliding bolt working in a recess in the upper part of the break-off, and engaging in a hole “in the rib between the barrels.” The bolt is made in two parts connected by a joint; the anterior has a sliding motion only, the posterior has a vertical motion also. The bolt is drawn back by depressing a lever, which has its lower end “curved so as to form the trigger guard.” The extractor consists of a “lever turning on a joint underneath the barrels, and midway between them;” it has its upper part curved and “falling into and forming part of the ends of the barrels;” or the top of the lever “may engage in a sliding piece on the top of the barrels.” When the barrels are turned down, and the breech ends rise, “the lower part of the lever is

"pressed towards the muzzle of the gun;" the upper part catches and extracts the exploded cartridges.

[Printed, *sd.* Drawing.]

A.D. 1863, September 12.—N° 2248.

WALLIS, CHARLES EDWIN.—(*Provisional protection only.*)—"Improvements in revolving fire-arms."

In each chamber of the revolving cylinder it is proposed to place two charges of powder and ball, and discharge them one after the other by means of two nipples or a compound nipple with two channels. By this means a cylinder of eight chambers is to be made capable of firing sixteen charges.

[Printed, *4d.* No Drawings.]

A.D. 1863, September 12.—N° 2250.

CLARK, WILLIAM.—(*A communication from Thomas Jefferson Vail.*)—"Improvements in revolving fire-arms."

The cylinder opens "by a movement on a hinge joint arranged in front of and below the line of the axis of the cylinder, and with an axis pin secured to the barrel by a spring latch," which serves to connect the barrel with the upper part of the frame, and to secure the cylinder "upon the axis pin when the barrel is disconnected from the upper part of the frame." The axis pin is so constructed "that while remaining attached to the barrel or frame it may be employed to expel from the chambers" the discharged cartridge cases. A "detachable recoil plate" is used in combination with the spring that keeps the revolving dog to its work;" it allows "the dog to work through it" and "aids the spring" in excluding gases from the lock. A "fly or swinging dog" is applied in connection "with the tumbler of the hammer or lock, and in combination with the locking lever, for the purpose of unlocking the rotating cylinder, just before the hammer" produces the rotating motion. The cap plate and the lock are opened "without disturbing the hammer pin."

[Printed, *10d.* Drawing.]

A.D. 1863, September 18.—N° 2302.

SMITH, WILLIAM.—(*A communication from John Gregory.*)—(*Provisional protection only.*)—"Improvements in constructing breech-loading ordnance."

The gun is to be bored through, and an opening is formed at right angles to the axis of the bore, in which is placed a breech block or vent piece. A band or hoop is fitted on the outside of the breech, over the opening of the gun. An opening corresponding to that in the gun is made in the hoop, which allows the breech piece to be withdrawn and replaced; when the hoop is turned round it secures the breech piece in its place.

[Printed, 4d. No Drawings.]

A.D. 1863, September 18.—N° 2303.

SMITH, WILLIAM.—(*A communication from John Gregory.*)—"Improvements in the construction and mode of working ordnance for ships and forts, and in the means of protecting those engaged in working guns employed for such purposes."

A double gun is made by forging or casting it so that two barrels are connected breech to breech, the muzzles being in opposite directions. There are two touch holes and the gun is mounted in a carriage made to revolve. Port holes are closed by sliding covers worked by chains or ropes.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, September 19.—N° 2313.

LE PATOUREL, JOHN PAUL BAUGH.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The breech is to be made a fixed piece connected with the stock, and sufficiently large to contain the charge of powder and projectile. The barrel is made to slide, and is moved away from the breech to allow the charge to be inserted.

[Printed, 4d. No Drawings.]

A.D. 1863, September 23.—N° 2346.

ELEY, WILLIAM THOMAS.—"Improvements in the manufacture or construction of ball cartridges."

The bullet is made with a recess in the rear, and an annular groove is made in the lip of the base, into which the end of the cartridge tube is inserted. The lip of the bullet is then compressed, and the paper or other material of the cartridge is caught and held in the compressed annular groove.

[Printed, 6d. Drawing.]

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A.D. 1863, September 24.—N° 2353.

DRONKE, ERNEST.—(*A communication from Edward Schultze.*)—(*Provisional protection only.*)—"An improved mode of manufacturing gunpowder suitable for war, mining, and general purposes."

Explosive granulated mixture is to be made from the grains of wood formed by cutting up thin sheets. The grains are obtained as porous as possible, and are first treated with alkalis hot. They are then made inflammable by "application of chloride and then of nitrous acid." They are then made explosive by treating them with "nitrate of potash, and in some instances by kali-ferro-hydrocyanicum."

[Printed, 4d. No Drawings.]

A.D. 1863, September 24.—N° 2359.

NEWTON, ALFRED VINCENT.—(*A communication from Alfred Nobel.*)—"Improvements in the manufacture of gunpowder and powder for blasting purposes."

An "improved powder, suitable either for ammunition or blasting purposes," is prepared by mixing fulminating substances, such as "nitro-glycerine, and the nitrates of ethyle and methyle." Nitro-glycerine is prepared "by introducing slowly glycerine into a cool mixture of sulphuric acid and nitric acid, or sulphuric acid and nitrate of soda or potash, the sulphate of soda or potash which is formed being removed from the liquid." The nitro-glycerine is mixed with gunpowder and dried. The retardation of the explosion of the powder is effected by mixing it with other suitable fluids "such as oil, in such quantity as not to destroy its granular character." The nitro-glycerine "to cause explosion should be heated to 170° Centigrade."

With powder formed "solely of carbon and sulphur the nitro-glycerine will replace to some extent the saltpetre."

[Printed, 4d. No Drawings.]

A.D. 1863, September 28.—N° 2380.

HARLOW, JOHN TERTIUS, and HARLOW, EDMUND.—"Improvements in breech-loading fire-arms."

Barrels that turn down on a hinge to receive the charge are locked by a bolt, that takes into a recess formed in the lump

attached beneath the barrels. The bolt may be actuated by a lever fixed below the stock, or may be connected with the lock motion, and be withdrawn when the hammer is raised.

The lump is made in the form of a wedge which fits the recess in the body, into which the lump enters, and so takes the strain off the joint. The distance to which the barrels can be turned down is limited by a bar or by stops. A vertical lever jointed to the front of the break-off is used as an "extractor." When the breech is raised after discharge one end of the vertical lever "strikes against the face of the break-off;" the other end is moved from the end of the barrel, and draws out the discharged cartridge. The breech end of the barrels may be closed by a hinged block, which is raised into and withdrawn from the ends of the barrels.

[Printed, 1s. 6d. Drawings.]

A.D. 1863, September 30.—N° 2399.

BROWNE, BENJAMIN.—(*A communication from William Brighton.*)—"An improved sight-piece for rifles."

A pendulum sight is used to enable a marksman to know when his piece is held in an upright position. A "hollow flat piece of metal, with a long slit therein," is suspended from a rectangular frame fixed on the barrel. On either side of the slit may be hung two pendulous pieces, or one may be used having a slit coinciding with that in the flat piece.

[Printed, 8d. Drawing.]

A.D. 1863, October 1.—N° 2401.

MACKAY, JAMES.—"Certain improvements in fire-arms, "ordnance, and projectiles."

Diagonal grooves are formed in the interior of the gun at a great angle, "which act as windage grooves, so that the powder and gas passing down such grooves encircling the projectile shall have a longer distance to travel than the projectile, and also to cause the projectile to revolve round its longest axis at a high rotation as it passes down the gun." The projectiles "do not enter or fit these grooves," but "pass down the smooth surface in which the grooves are formed."

Projectiles, such as were described in the Specification of prior Letters Patent dated April 16, 1862, N° 1801, are made of such

a shape that the centre of gravity is in a fixed point, "so as to cause them to strike on end." Wood, sawdust, cotton wood, tow, or other elastic material, is "placed between the powder and projectile, which, when the concussion of explosion takes place, causes the projectile to become slightly and easily moved before the full power of the powder acts upon it." The material is "saturated with oleaginous matter to give lubrication."

[Printed 1s. 2d. Drawings.]

A.D. 1863, October 1.—N^o 2410.

HORSLEY, THOMAS.—"Improvements in breech-loading fire-arms."

Barrels that turn down on a hinge to receive the charge are locked by a bolt which takes into a recess below the barrels. The bolt is urged by a spring, and to withdraw it motion is given "from a slide that is situated above the tang that projects from the top of the back of the breech plate." The slide is "connected to the top of a lever that is pin jointed or otherwise connected with the bolt." The bolt is "by preference made hollow, and is pressed forward by a spiral spring placed inside it."

[Printed, 8d. Drawing.]

A.D. 1863, October 2.—N^o 2420.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Stephen Wood.*)—(*Provisional protection only.*)—"Improvements in revolver fire-arms."

The lock of the revolver is to be so constructed that the hammer may be cocked by hand and the piece discharged by pulling the trigger, and also that the hammer may be cocked and let fall "merely by pulling the trigger."

[Printed, 4d. No Drawings.]

A.D. 1863, October 6.—N^o 2441.

MATHEWS, SAMUEL.—"Improvements in breech-loading fire-arms."

Barrels which are turned down to receive the charge are locked by a bolt that slides in a recess in the break-off, and engages in a hole formed in the lump attached underneath the barrels.

[Printed, 1s. Drawings.]

A.D. 1863, October 8.—N° 2464.

CROSWELL, CALEB.—(*A communication from Samuel Strong.*)
 “Improvements in breech-loading fire-arms.”

The breech of the piece is closed by means of a hinged breech block, which fits in a chamber formed in the rear of the barrel, and is moved to the left upon a horizontal axis. A spring safety bolt is connected with the breech block, which prevents the fall of the hammer when the block is not “home.” Primed metallic cartridges are employed, and a hooked catch connected with the breech block extracts the cartridge by catching the rim of the flange of its metallic base. When the piece is intended to be used as a muzzle-loader, a suitable plug is inserted in the breech end of the barrel. In some cases a forked lever, worked by the trigger action, is used as an extractor to extract the spent cartridge case.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, October 8.—N° 2466.

CANOUIL, GERMAIN, and BLANCHON, FRANÇOIS ARMAND.
 —(*Provisional protection only.*)—“Shooting toy fusees, toy rockets, or other similar toy missiles, by means of toy pistols or other toy fire-arms.”

A paper rolled spirally is to be dipped in or coated with suitable firework composition. The composition is to be ignited “by the explosion of a percussion cap or paper amorce.”

[Printed, 4d. No Drawings.]

A.D. 1863, October 8.—N° 2468.

DOUGALL, JAMES DALZIEL.—“Improvements in ‘camel guns’ and other light artillery, which improvements are also applicable to ‘punt-guns’ or other heavy fowling pieces or rifles.”

A breech piece is “made of solid metal, and sufficiently long to absorb the force of the recoil.” The breech piece is hinged to the barrel, and is turned down to enable the charge to be inserted in its chamber. The pin on which the breech piece is hinged is fitted with an eccentric, which is turned by a handle, so as to force the face of the breech piece “firmly against the rear end of the

"barrel." An annular recess, formed on the face of the breech piece, is forced upon a projection formed on the rear end of the barrel, and makes a gas-tight joint. Instead of an eccentric a toothed wheel or segment and rack may be employed. The gun may be fired from a tripod stand, or be mounted on a light carriage.

[Printed, 8d. Drawing.]

A.D. 1863, October 12.—N^o 2494.

HUTCHISON, WILLIAM. — (*Provisional protection only.*)—"Improvements in the manufacture or fittings for powder flasks."

The neck of the powder flask is to be closed with a tubular stopper, "with a suitable head to hold one measure or charge of powder." The neck and stopper or either of them may be made of an alloy or combination of lead and tin. In the lower part of the neck is a valve made of a ring or disc of india-rubber.

[Printed, 4d. No Drawings.]

A.D. 1863, October 13.—N^o 2508.

POYNTER, JOHN EDGAR.—"Improvements in throwing projectiles by means of explosive agents, and in apparatus therefor."

The projectile is made with a large recess in the rear, which enables it to be fitted on the outside of a hollow mandril attached firmly to a strong solid base. The charge of explosive material, gun cotton, or gunpowder, is placed inside the hollow mandril, and when fired propels the projectile.

[Printed, 8d. Drawing.]

A.D. 1863, October 19.—N^o 2554.

FLETCHER, WILLIAM.—"Improvements in the construction of breech-loading fire-arms."

The barrels which turn down on a joint to receive the charge are locked by means of a lever, which works on a horizontal axis below the breech, and has a hooked projection on its upper part. On the under side of the barrels are formed two projections, "one of which bears against the axis on which the barrel or barrels move. The other projection" engages in the hooked projection of the lever. The lever works in front of the trigger

guard, and when pushed forward releases the barrels. The locks employed are of the "bar pattern."

[Printed, 10d. Drawing.]

A.D. 1863, October 19.—N° 2555.

BUDENBERG, ARNOLD. — (*A communication from Bernhard August Schüffer and Christian Friedrich Budenberg.*)—"An improved blasting powder."

A powder applicable to blasting purpose, and "giving an increased effect with a slow and perfect combustion," is made by combining 30 to 38 parts of nitrate of potash.

40	„	nitrate of soda.
8 to 12	„	sulphur.
7 to 8	„	wood charcoal.
4 to 6	„	potassio-tartrate of soda.

[Printed, 4d. No Drawings.]

A.D. 1863, October 20.—N° 2567.

HENNESSY, HENRY.—(*Provisional protection only.*)—"An improvement in projectiles."

An archimedean screw attached to a disc is to be so placed behind the projectile that the force of the explosion will drive the disc upon, and connect it with, the base of the projectile, and so give it rotary motion. On meeting with the resistance of the air, the disc is to be detached by unscrewing it, or by the aid of a spring, or by means of other disconnecting agency.

[Printed, 4d. No Drawings.]

A.D. 1863, October 20.—N° 2576.

HUTCHINSON, WILLIAM NELSON.—(*Provisional protection only.*)—"Improvement in ordnance."

Guns are proposed to be made "of several concentric steel tubes," and between every two tubes is a space of about a quarter of an inch, "into each of which spaces, water or other liquid, under "pressure or not," is to be admitted "through a pipe at "the rear or other part of the gun."

The recoil of ordnance is to be received by india-rubber bands connecting the carriage to the embrasure, or port, or other fixed points.

[Printed, 4d. No Drawings.]

A.D. 1863, October 21.—N° 2580.

HINTON, JOSEPH.—“An improvement or improvements in “ breech-loading fire-arms.”

Barrels which turn down on a joint are locked, by means of “a curved bolt” attached to a horizontal axis, working in a recess parallel with the face of the break-off. On the end of the axis is a projecting thumb-piece, by means of which it is turned, and so engages the hooked bolt in a recess in the end of the rib between the barrels. “Instead of withdrawing the curved bolt by pressing “a thumb-plate at the side of the gun,” the bolt may be withdrawn by pressing a thumb-plate “situated on the tang of the “break-off.”

[Printed, 8d. Drawing.]

A.D. 1863, October 22.—N° 2597.

FUSNOT, CHARLES.—“Certain improvements in the manufacture of cartridge bottoms, or entire cartridges composed entirely “of the same elements.”

Metallic cartridges, intended to be discharged by a pin striker, are made in one piece, by “stamping, casting, or other suitable “process.” The “internal paper washer or packing ring at the “bottom of the cartridge” is dispensed with, and is replaced “by the metal itself.” An opening for the percussion cap is made “in the metal,” forming the base of the cartridge case.

[Printed, 8d. Drawings.]

A.D. 1863, October 24.—N° 2633.

SELLAR, ALEXANDER.—(*Provisional protection only*).—“An “improved instrument for lubricating rifles and other descriptions of fire-arms, also ordnance.”

A vessel or box lined with sponge is to be used for lubricating bullets. An interior chamber is formed to receive oil, which exudes through perforations, and lubricates a bullet inserted in the central opening left in the box or vessel. A sponge attached to the outer surface of a receptacle filled with oil is used for sponging and lubricating ordnance.

[Printed, 4d. No Drawings.]

A.D. 1863, October 26.—N° 2639.

MARSH, THEOPHILUS.—(*Provisional protection only.*)—"Improvements in projectiles."

Grooves or inclined surfaces are to be made upon the surfaces of conical projectiles intended to be fired from smooth-bore guns. The resistance of the air acting on the inclined surfaces gives rotation to the projectile.

[Printed, 4d. No Drawings.]

A.D. 1863, October 27.—N° 2650.

WILSON, JOHN CHARLES.—"A new mode of mounting ordnance and the machinery and apparatus composing the same, also the machinery and apparatus for working said ordnance, and for loading, cleaning, and counteracting its recoil when fired."

Guns are mounted on a circular frame or disc, being fixed in a radial direction, so that the weight of one may counterbalance that of another. The disc is supported and turns on a central spindle, and is turned and elevated or depressed by hand spikes, or by a winch handle working a pinion geared into a toothed wheel.

[Printed, 8d. Drawing.]

A.D. 1863, October 28.—N° 2669.

HENRY, MICHAEL.—(*A communication from Antoine Perrin, Henry Augustin Joseph Hovelacque, Edouard Joseph Hovelacque, and Emile Auguste Hovelacque.*)—"An improvement in, or addition to, military knapsacks, travelling bags, and other similar articles."

Sheets of waterproof skin or other material are cut in such shapes that they may be attached together, and form a bed on which a man may lie. They may then be folded up, and, by means of straps attached in suitable parts, be made to form a knapsack or bag.

[Printed, 8d. Drawing.]

A.D. 1863, November 3.—N° 2720.

RÉVY, JULIAN JOHN.—"Improvements in the manufacture of explosive compounds."

The improvements are based upon those described in the Specification of prior Letters Patent, dated April 15, 1862, N° 1090. Cotton intended to be converted into gun cotton is first washed in a weak solution of potash or other alkali (3° Beaumé) to remove greasy particles, and then washed in water. The cotton, when thoroughly dried, is dipped in the acid bath composed of one part of nitric acid, s. g. 1·485, and two parts of sulphuric acid, s. g. 1·84. The gun cotton, after being properly dipped in the acid, and washed, and dried in a centrifugal machine, is impregnated with a solution of water glass at a temperature of about 82° F. This is done by placing it between two cylinders, the outer one being perforated, and causing the solution to flow in while the cylinders are slowly rotated, and then stopping the flow and increasing the speed to the rate of about 1,200 revolutions per minute of a 30-inch drum.

[Printed, 1s. Drawings.]

A.D. 1863, November 6.—N° 2754.

DAVIES, WILLIAM, and CATE, GEORGE.—(*Provisional protection only.*)—"Improvements in machinery for cutting corks, " bungs, gun wads, and other similar articles."

Circular pieces of cork, suitable for gun wads and other purposes, are proposed to be cut by a knife to which circular motion is given. The knife is attached to a roller, which receives the requisite motion by causing it to move between two ribs, while a pin fixed in a slide travels along a slot or groove formed in it.

[Printed, 4d. No Drawings.]

A.D. 1863, November 7.—N° 2768.

HOYT, JEHIEL KEELER.—(*A communication from Benjamin Franklyn Joslyn.*)—"Improvements in revolving fire-arms."

Metallic cartridges are used with a revolver. The recoil of the discharged cartridge is resisted by a recoil plate, which "yields" slightly to the force of the shock," and then reacts against the head of the exploded cartridge, and allows the charge cylinder to rotate freely. The breech plate is so constructed that it permits "a limited movement of the cylinder laterally from the frame," and guides it back to its position.

Means of easily releasing the cylinder are described; also a method of operating the cylinder through the movement of the

hammer. The stock and frame are made in two parts, and a rod and arm are so arranged as to serve as a centre pin and an instrument for forcing the spent cartridges from the cylinder.

[Printed, 1s. 2d. Drawings.]

A.D. 1863, November 7.—N° 2773.

MELLAND, GEORGE STEPHEN.—(*A communication from Jacob Snider, junr.*) — (*Provisional protection only.*) — “Improvements in breech-loading fire-arms and ordnance.”

The improvements proposed are founded upon those described in the Specifications of prior Letters Patent, dated respectively April 1, 1857, N° 907, and November 29, 1860, N° 2933. The moveable breech piece that closes the rear of the barrel is to be “secured by a self-acting latch bolt, which takes into an aperture provided for its reception so soon as the breech piece is pressed down by hand.” The hammer in falling prevents the bolt from leaving the aperture. The breech is unlocked by pressing a button on a lever attached to the latch bolt, and “the breech is raised by hand.” The fire communication is central. The hinge and breech are in one piece, and the hole of the hinge pin is oval. An aperture is formed on the under surface of the breech, for “the introduction of lubricating material into the valve chamber.”

[Printed, 4d. No Drawings.]

A.D. 1863, November 11.—N° 2805.

MELTON, HENRY.—(*Provisional protection only.*) — “Improvements in shakos, military and other hats and caps.”

The bodies of hats or caps are to be made “of horsehair crino-line, or of tweed and horsehair mixed, or other soft material or flexible fabric, such as felt or leather, instead of gossamer or the ordinary stiff materials hitherto used.”

[Printed, 4d. No Drawings.]

A.D. 1863, November 14.—N° 2840.

GLADSTONE, HENRY.—“Improvements in the manufacture of skin cartridges.”

The skin or membrane used for cartridges is treated with a chemical preparation to render it waterproof and prevent decom-

position. The preparation is formed of "one or several of the following substances :—Arsenic, alum, acetate of lead, bichloride of mercury, chloride of sodium, soap, camphor." The cartridge is covered with French polish. Wax and castor oil are mixed to form a lubricant.

[Printed, 4d. No Drawings.]

A.D. 1863, November 16.—N° 2870.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Albert Hook.*)—"Improvements in the manufacture of cartridges."

An annular recess is formed in the base of the projectile, into which the end of the paper tube or case of the cartridge is inserted. The base of the projectile is then compressed, so as to nip and hold tight the edge of the cartridge case and so attach it to the projectile.

[Printed, 6d. Drawing.]

A.D. 1863, November 17.—N° 2876.

PARSONS, PERCEVAL MOSES.—"Improvements in the construction and manufacture of ordnance, parts of which are applicable to small arms."

Built-up guns are to be made of wrought iron or steel tubes provided "with shoulders," and screws are employed "in connexion therewith, by the united action of which a sufficient portion of each tube is embraced at both ends, and confined longitudinally as well as circumferentially by the one surrounding it." Cast-iron guns are lined with wrought-iron or steel tubes, which are screwed in. Strengthening hoops or rings are expanded, before they are put on inner tubes, by immersing them in baths of hot oil or other liquid, or in molten metal or alloy.

Breech-loading guns are to be made with a spherical breech piece, having an aperture coinciding with the bore, and capable of being turned so as to close the bore. Guns are rifled with grooves whose cross section is formed by two arcs of circles, struck from centres "placed at any convenient points on a line passing through the centre of the bore, at right angles to a line drawn from that centre to the centre or bottom of the groove."

[Printed, 1s. Drawing.]

A.D. 1863, November 17.—N° 2879.

BAKER, VALENTINE.—(*Letters [Patent void for want of Final Specification.]*)—"Improvements in breech-loading ordnance and "in apparatus connected therewith."

The breech of the gun is to be closed by a plug, which is inserted and locked by means of projections formed on it, which fit into grooves formed in the interior surface of the barrel.

"Levers, screws, or other mechanical means may be used for "turning and withdrawing the plug."

[Printed, 4d. No Drawings.]

A.D. 1863, November 18.—N° 2883.

MAYER, RUDOLPH.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms and in bayonets and cartridges "connected with the same."

The breech of the gun is to be closed "by means of a metallic "bar lever, or radial link movement contained within the stock."

The cartridge is to be formed "with an inner core of wood "passing through the powder, "provided with a level wrapper per- "cussion tube and ball united longitudinally." The lock is to be made to act beneath the barrel and drive a striker upwards.

[Printed, 4d. No Drawings.]

A.D. 1863, November 18.—N° 2887.

COOPER, JOSEPH ROCK.—(*Provisional protection only.*)—"Improvements in the manufacture of barrels for fire-arms, and in "machinery to be used in the said manufacture."

Barrels are to be bored by self-acting machinery, consisting of two drills or bores which are made to bore the cylinder from the two opposite ends at the same time. The drills may be fixed while the cylinder is made to rotate, or the drills may have a rotatory as well as a reciprocating motion given to them.

[Printed, 4d. No Drawings.]

A.D. 1863, November 18.—N° 2888.

WIGFALL, WILLIAM, and JOLLY, GOTTLIEB.—(*Provisional protection only.*)—"An improved explosive compound to be used in "the manufacture of cartridges and an improved mode of manu- "facturing cartridges therewith."

A small portion of an explosive composition, called "Prussian fire," is to be fixed centrally in the base of the cartridge, so that it can be exploded by a needle or striker. The composition is to be made of carbon, 4 parts; gums, 4; aqua fortis, 6; red lead, 40; phosphorus, 4; sulphur, 2; chlorate of potash, 25; sugar of lead, 6; cannel coal, 1; saltpetre, 3; and steel filings, 4 parts.

[Printed, 4d. No Drawings.]

A.D. 1863, November 30.—N° 2998.

PILON, MARTIN REGUL.—"Improvements in fire-arms."

In order to lessen the effect of the recoil of small arms, the barrel is made moveable, and its recoil on discharge acts first on a spring and then on a bar, "and therefore meets a resistance firstly flexible and then firm." The trigger is so arranged that it is moved by the pressure of the thumb, so that the aim is not disturbed by the pull of the trigger. The breech is closed by a moveable "breech stopper or closer," which may be detached and "be repaired and renewed in case of wearing out, without the necessity of changing anything in the fire-arm."

[Printed, 1s. Drawings.]

A.D. 1863, November 30.—N° 2999.

CHALMERS, JAMES. — (*Provisional protection only.*) — "Improvements in guns and gun projectiles."

The "rifling" of the guns is to be formed of "grooves and lands or ribs of equal, or nearly equal, width." For an 8-inch gun 12 grooves are used, $\frac{1}{16}$ -inch deep and 1 inch wide; half the groove is of "the full depth" and half "tapered to the level of the rib." A gradually increasing twist is employed.

Elongated projectiles having the middle parts of reduced diameter and a soft metal band on the rear, are employed.

[Printed, 4d. No Drawings.]

A.D. 1863, December 1.—N° 3005.

BOXER, EDWARD MOUNIER.—"Improvements in fuzes and shells for ordnance."

Wooden time fuzes made in the ordinary way, as regards the position of the chamber for the slow burning composition and the side channel for the gunpowder, have the composition bore lined

with paper, or papier maché, and the part of the body of the fuse intervening between the powder channel and composition bore is wholly or partially bored through, to enable a communication to be opened at the exact point required. The lining serves to protect and preserve the composition.

The head of the fuse is closed with a screwed plug or cap, to prevent the fuse from being extinguished on the projectile striking an object. Ignition is effected through side apertures formed in the body of the fuse. The head of the fuse is bound round with wire to prevent its splitting when the plug is inserted. In connexion with the time-fuse a percussion fuse or "detonator" is used. The hammer of the "detonator," which is inserted in a chamber in the head of the fuse, is held by a securing wire of "hard tough metal," and is liberated by the shock of the discharge. The time-fuse with or without the "detonator" may be inserted in the head of the shell and used as a percussion fuse. Instead of the ordinary plug or striker, used in the ordinary percussion fuse, a disc with a projecting pin is employed to effect ignition; the disc is of such a thickness that on striking the object the disc is bent in, and the pin fires the detonating mixture. In connexion with the percussion disc, a chamber containing slow burning composition is used, being interposed between it and the powder charge; the composition is bored "partially or wholly through," so as to communicate flame to the powder after a given interval, or immediately.

"Concussion fuses" have one part primed with "amorphous phosphorus protected from damp by the admixture of varnish or gum, while another part of the fuse is primed with any known composition not of a very detonating character." The fuse is formed of a hammer of copper or brass, or gun metal, "securely fixed to a hollow cylinder by means of a copper or brass wire passing through both, so arranged that the cylinder on the breaking of the wire can move along the hammer and fix itself to the same by means of a pointed projection on the one fitting into a corresponding recess in the other." The end of the hammer is thus retained, until the wire is broken by the shock of the discharge, at a fixed distance from the pin, which may be primed by amorphous phosphorus, or other means of ignition may be used. When the wire is broken by the discharge, the hammer is connected to the cylinder, and on the projectile striking an object the head of the hammer is brought in contact

with the pin and ignition is effected. The concussion fuses are suitable for being used with the "shrapnel shell."

[Printed, 1s. Drawings.]

A.D. 1863, December 1.—N° 3016.

INGLEFIELD, EDWARD AUGUSTUS.—"Improvements in apparatus for mounting and working guns used in ships and other floating vessels, and in fortifications."

The gun is worked upon a moveable platform, having upon it a graduated scale and ways for working the gun. The gun is raised and lowered from a lower deck, where it is loaded, to an upper deck where it is fired, by means of a piston attached to the platform, and working in a cylinder by means of steam. The gun is laid by a fixed telescope not connected with the gun but placed at a known angle with its axis. Instead of steam, water power may be used for working the pistons attached to the various gun carriages. For fortifications a similar arrangement may be employed for loading the guns at one elevation, where the men who work are protected, and raising them by steam or water power to a higher level, where they are fired.

[Printed, 1s. 4d. Drawings.]

A.D. 1863, December 7.—N° 3072.

RICHARDS, ROWLAND, and WILLETTS, SAMUEL CLEMENT.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

Barrels which turn down on a joint to receive the charge, are to be cocked by means of a "vertical lever," which is situated "behind the break-off." The free end of the lever "passes through" and works in a rectangular slot or opening in the tang of the "break-off," and is "provided with a thumb plate by which the lever can be moved," and so be disengaged from a recess in the lump, into which it is pressed by a spring when the barrels are shut down. The thumb plate of the lever may be made into a sight.

[Printed, 4d. No Drawings.]

A.D. 1863, December 8.—N° 3087.

BLAKELY, THEOPHILUS ALEXANDER.—"Improvements in projectiles for ordnance, and in loading and firing ordnance."

A "cupped ring or concave disc of copper or other similar metal" is attached to the rear end of the projectile, in such a manner that when the charge is exploded the edge of the ring or disc is forced into the rifling grooves.

A loading rod is used for loading ordnance at the muzzle. The rod is pushed through an aperture in the breech, and has attached to its end a piston and shelf. The shelf is pushed beyond the nozzle, and the charge is placed upon it and fastened by a string or otherwise to the piston, which is then drawn back to the breech of the gun. The piston closes the aperture in the breech while the charge is fired. The vent may be made through the travelling piston, or the charge may be fired by means of detonating mixture.

[Printed, 8d. Drawing.]

A.D. 1863, December 8.—N° 3088.

BLAKELY, THEOPHILUS ALEXANDER. — "Improvements in metallic packings."

Metallic packing, suitable for being inserted in guns to make a gas-tight joint, is made in the form of a "hollow metallic ring," or of "a corrugated or lipped plate." The elasticity of the ring or plate enables it to expand and close the joint to which it is fitted.

[Printed, 10d. Drawings.]

A.D. 1863, December 9.—N° 3102.

FLETCHER, THOMAS HANMER, and FORREST, ROBERT.—
"An improved war rocket and rocket tube."

The rocket tube from which the rocket is fired has three or more "spiral planes affixed to its internal surface," the turn of the spiral being such as will give the requisite velocity of rotation to the rocket. Upon the outside of the rocket case, which is made of iron or other suitable material, are formed spiral ribs or flanges corresponding to those made in the tube. In some cases "a gain twist or graduated twist" may be employed. When the rocket is fired from the tube sufficient rotation is given to it to keep it front foremost during flight.

[Printed, 10d. Drawing.]

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A.D. 1863, December 9.—N° 3108.

KENNEDY, NEIL.—(*Provisional protection only.*)—"Improvements in fire-arms."

A hole is proposed to be bored "longitudinally through the "stock," into which a cartridge holder is fixed for the purpose of supplying cartridges which are inserted in the breech of the barrel. The breech is to be closed by a "metal plate moving on a hinge." Caps are supplied to the nipple by means of a moving steel band "punctured with eight or ten or other number of holes," which is "made to pass over the nipple."

[Printed, 4d. No Drawings.]

A.D. 1863, December 14.—N° 3159.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, projectiles, and cartridges, and in tools or apparatus for the manufacture of projectiles."

The proposed improvements are based on those described in the Specification of prior Letters Patent, dated May 28, 1859, N° 1318. The breech end of the barrel is closed by a sliding piece, which is locked by a "bolt or cotter" connected to the "under side of "a lever jointed to the breech end of the barrel," and having "a "vertical motion." The lever is "provided with a thumb plate, "by which the said lever is raised." To the front end of the sliding plug is jointed a steel bar. In the breech end of the barrel is formed a chamber closed by a lid or plate, on the under side of which are "two circular eyes," through which the plug is "passed and supported." The plug is moved by a screw motion working in a "screw box."

Barrels of "drop-down fire-arms," which turn down on a joint, are fastened by a locking bolt taking into a recess in a lump attached to the under side of the barrels. Barrels that slide upon the stock have a projecting tongue passing "through a slot in the "break-off, and fastened by a lever or bar" moved by a thumb "plate." Ribs are formed on the front part of mechanically fitting projectiles. Cartridges are made with a percussion patch fixed in a disc fastened in the base of the case.

[Printed, 4d. No Drawings.]

A.D. 1863, December 15.—N° 3164.

NOBEL, LUDWIG.—“Improvements in the manufacture and strengthening of guns, hydraulic press, and other cylinders.”

Guns and cylinders are strengthened by coiling round them wire or strips of metal coated with tin or suitable alloy. The gun or cylinder is also coated with tin or alloy, and while it is hot the wires or strips are coiled round so that they form, when cold, a solid mass. Rings or bands may be shrunk or otherwise placed on the coiled wire or strips.

[Printed, 4d. No Drawings.]

A.D. 1863, December 16.—N° 3171.

SMITH, JOSEPH.—“Improvements in breech-loading fire-arms.”

Barrels that are tilted or turned down to receive the charge are fastened by a locking bolt that takes into a recess formed in a lump attached to the under side of the barrels. Upon the bolt are formed teeth, in which work the teeth of a pinion or sector moved by a lever, which is pressed towards the break-off so as to release the barrels, against the action of a spring which presses the bolt into the recess.

[Printed, 1s. Drawings.]

A.D. 1863, December 16.—N° 3179.

BLAKELY, THEOPHILUS ALEXANDER.—“Improvements in the construction of cannon and other ordnance.”

Built-up guns are made of cast-iron tubes. “Each tube is cast separately, bored, and turned, and the tubes are shrunk or otherwise fitted over one another, in such a manner that the second shall compress the first or innermost tube, and so on in succession for as many tubes as are employed.” By preference, the outer tube is made of “harder or less extensible cast iron” than the tube on which it is fitted. In some cases the guns so made are strengthened by outer steel hoops, or the breech is “lined with a metal softer even than the innermost cast-iron tube.”

[Printed, 4d. No Drawings.]

A.D. 1863, December 17.—N° 3185.

MARRISON, ROBERT.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms.”

A "combined forward and side motion" is to be given to the barrel, on the under side of which is "a pin projecting downwards, " which works in a groove in the body of the gun." The double movement by which "the barrel is carried forward and aside" is given by means of a lever.

[Printed, 4d. No Drawings.]

A.D. 1863, December 18.—N° 3192.

GARDNER, PETER.—(*Provisional protection only.*)—"Improve-
ments in the construction of ordnance and in projectiles to be
" used therewith."

Projectiles intended to be fired from smooth-bore guns are to be made with a stem attached to the rear part of the projectile. The stem passes through the powder cartridge and through an aperture in the breech of the gun. When the projectile is fired the stem is intended to guide it and keep it front foremost.

[Printed, 4d. No Drawings.]

A.D. 1863, December 18.—N° 3194.

PARSONS, PERCIVAL MOSES.—(*Provisional protection only.*)—"Improvements in ordnance, fire-arms, and projectiles."

Built-up guns are made of tubes or rings connected together by means of screws and shoulders, as described in the Specification of Letters Patent, dated November 17, 1863, N° 2876. A projectile for rifled ordnance and small arms is made "of a tube of steel," having its rear end closed by a plug of suitable metal extending a sufficient distance beyond the rear of the projectile, and shaped to fit the rifling of the gun. Hollow projectiles have the front also closed by a plug; solid projectiles have the plug extended throughout the length of the tube.

[Printed, 4d. No Drawings.]

A.D. 1863, December 23.—N° 3249. (* *)

MATTHEW, JOHN.—"Improvements in the construction of batteries for ships, forts, and other defences." The invention, as applied to forts, consists in the employment of an iron or other metal tower encased in masonry or otherwise, covered or surrounded by a glacis, and with an inner turret made to rise so that the gun or guns may be fired over the glacis and fall again to

reload. The gun or guns and the gunners are thus concealed from the enemy and protected from fire. "I mount the gun or guns on a turn-table or revolving platform, so that they may be fired in any direction required."

The invention may be applied to ordinary batteries, and also to ships of war. In the latter case "I raise and lower the gun platform, whether traversing or otherwise, by hydraulic or other power, as may be found most convenient."

[Printed, 10d. Drawings.]

A.D. 1863, December 23.—N° 3250.

CLARK, WILLIAM.—(*A communication from John Jordan Eckel.*)—(*Provisional protection only.*)—"Improvements in percussion fuzes for igniting the charges of explosive projectiles, mines, torpedos, and other charges of gunpowder, or other explosive or easily inflammable substances or compounds."

The fuse proposed is made of "a fulminating capsule composed of glass or other frangible material containing a quantity of sulphuric acid, and coated externally with a compound of sulphur and potassa." When the capsule is fractured the sulphuric acid is brought in contact with the sulphur, and ignition takes place and proceeds slowly. The capsule may be applied to grenades, hollow projectiles, or torpedos.

[Printed, 4d. No Drawings.]

A.D. 1863, December 23.—N° 3251.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Hervey Waters.*)—"Improvements in apparatus for forging and tempering bayonet blades, files, and other articles."

Bayonet blades are made by passing the bar or blank through chilled rollers by means of self-acting feeding machinery, consisting of tongs working "in a light carrying frame," to which suitable reciprocating motion is given.

In the continuation of the forging, and for the purposes of "swaging off," self-acting hammering machinery is employed. In the tempering process a bath of molten lead is employed to heat the blades. The lead is melted in a pan, and motion is given to the molten metal by means of a propeller, which causes a

current round the pan in which the blades are immersed with the heaviest ends next to the propeller.

[Printed, 5s. Drawings.]

A.D. 1863, December 23.—N° 3253.

NEWTON, WILLIAM EDWARD.—(*A communication from Philo Remington, Samuel Remington, and Eliphalet Remington.*)—"Improvements in breech-loading fire-arms."

Revolvers and other breech-loading arms having a barrel "bored through and through" are made with "a pivotted breech plate" combined with "an underhung hammer," so arranged that "the breech plate and hammer will lock with each other."

In some cases the hammer is itself made to resist the recoil, being hung "in advance of the rear of, and close underneath the barrel or cylinder, so as to enclose between a horizontal line drawn through its centre of motion and a line drawn from its centre of motion to the centre of the rear of the cartridge chamber, an angle somewhere between 15° and 27°, varying with the size of the arm and cartridge," so that the recoil will not force back the hammer.

[Printed, 10d. Drawing.]

A.D. 1863, December 24.—N° 3258.

NOBLE, ANDREW.—"Improvements in the mode of igniting explosive projectiles."

The improvements are applicable to the "Armstrong time fuze" and other fuzes.

The escape passage is "contracted or throttled," so as "to keep up a pressure of flame within the passage," and insure ignition of the bursting charge, when the fuze shall have "burned to the point at which it ought to fire the projectile." Beneath "the pellet, which is instrumental in igniting the fuze, a stemming of meal powder, or other combustible substance," is introduced, so as to maintain a jet of flame sufficient to insure "the ignition of the fuze composition."

A bend is made in "the discharging orifice," so as to cause "the igniting jet to be deflected at the point where it comes in contact with the fuze composition," and so effect ignition with greater certainty.

The body of the fuze is so formed "as to have solid metal instead of fuze composition above the igniting orifice," so as to prevent the jet of flame from "forcing a passage beneath the cover into the interior of the fuse," and so as thereby to lessen the tendency to premature explosion.

[Printed, 4d. No Drawings.]

A.D. 1863, December 24.—N° 3268.

BRYANT, JOHN DYER.—"Improvements in projectiles for ordnance."

Elongated projectiles, intended to be fired from smooth-bore guns, are fired with "a sabot," and are provided with wings or vanes that are hinged to the projectile so as to fit in recesses, and are made to expand on the projectile issuing from the bore. The action of the air on the inclined surfaces of the wings gives rotation to the projectile.

[Printed, 10d. Drawing.]

A.D. 1863, December 24.—N° 3270.

PRICE, DAVID SIMPSON.—(*Provisional protection only.*)—"Improvements in the manufacture of projectiles."

Projectiles for ordnance are to be made of "finers" metal or refinery metal, that pig iron which has undergone the refining process." The material is described in the Specification of prior Letters Patent, N° 2618, 1855.

The pig iron may be made from "hematite, magnetic oxide, and spathose ores" refined in an ordinary furnace. The projectiles are "cast direct from the furnace," or the metal may be remelted.

[Printed, 4d. No Drawings.]

A.D. 1863, December 28.—N° 3275.

LINDER, EDWARD.—"Improvements in breech-loading fire-arms and ordnance, and in apparatus for loading the same."

A gas-tight joint for the breech is made by "forming a chamber or recess behind a moveable piece in front and forming part of the breech block, which chamber is made to contain quicksilver, india-rubber, or other suitable elastic body; a conical or tapered

"ring with a flange at its rear end embraces the moveable piece." The breech block is moved by means of "a strong hollow or solid screw which passes into the rear of the gun, and the forward end of which is hollowed to receive a flange on the rear end of the breech block." Undercut projections are formed on the rear of the breech block, which fit into recesses in front of the hollow screw. Loading apparatus consisting of "a cylindrical case open at one end and closed at the other," is used for introducing the charge, which is pushed through the loading chamber into the breech of the gun by means of the rod or stem attached to the chamber.

[Printed, 8d. Drawing.]

A.D. 1863 December 29.—N° 3293.

PENISTON, WILLIAM MICHAEL.—(*Provisional protection only.*)—"Improvements in constructing and arming ships and floating batteries."

Armour plates for ships are proposed to be applied as an inner skin, where the plates may be placed "upright or nearly upright," and be flat and unbent. The outer skin is made of the usual curved forms required for the hull of a ship, and may be made of thinner iron plates, or wood.

The plates are fastened by ribs and the interstices or cells may be filled with cotton, wool, or other material. A wooden backing may be applied behind the armour plates. Guns may be mounted on moveable platforms, which are raised or lowered by hydraulic power.

[Printed, 4d. No Drawings.]

A.D. 1863, December 31.—N° 3308.

BYRNES, AUNGEIR, and BENJAMIN, HENRY.—"Improvements in breech-loading fire-arms."

In the rear end of the barrel the bore is enlarged, and the breech is closed by a sliding plug whose fore part fits against a conical shoulder in the barrel. To the plug is attached, by means of a hinge, a flap which closes an opening made in the top of the barrel. The back part of the plug is made of such a form that "when in a proper position it will come through the opening, but if turned in a certain position it will not do so." The flap has

a spring bolt which is actuated by means of a small bent lever, "so that by simply pressing upon the same the bolt is withdrawn." Part of the lever acts as a safety catch, which prevents the hammer from being raised to half-cock without catching the tail of the lever, and "closing the flap, and shooting the spring bolt." A gas-tight joint is made "between the conical plug and its seat in the bore," by fitting on the end of the plug a moveable piece, and placing a ring or disc of soft metal between the piece and the plug.

[Printed, 1s. Drawing.]

A.D. 1863, December 31.—N^o 3309.

RADLEY, JAMES.—"Improvements in mounting and serving guns used upon vessels and fortifications."

"A telescopic cupola or chamber" is constructed so as to contain one or more guns, and is "made to ascend from the second deck to an upper one by hydraulic or other suitable power, for the purpose of firing, and to descend after the firing to enable the gun or guns to be cleaned and reloaded." When the cupola has descended the top of the cupola is flush with the upper deck, and closes the aperture. In some cases the gun or guns may be mounted on a "disc or platform," which is made to ascend or descend as required. For land defences and fortifications moveable ascending and descending platforms are employed.

[Printed, 10d. Drawing.]

1864.

A.D. 1864, January 8.—N^o 50.

ADAMS, ROBERT.—(*Provisional protection refused.*)—"Improvements in the construction of breech-loading fire-arms."

Revolving fire-arms are proposed to be made with chambers that may be loaded from the rear. A "moveable shield is applied" behind the chambers "for the purpose of closing up the ends." The cartridges are exploded "by a hammer acting on a central pin." When desired, the shield and breech-loading chambers

may be removed, and "chambers arranged with nipples" may be substituted. A lever ramrod is used to force out the exploded cartridges or "for ramming home the charge when muzzle-loading chambers are employed." The "barrel-stock and lock frame" and trigger guard may be made "of one piece of metal."

[Printed, 4d. No Drawings]

A.D. 1864, January 8.—N° 55.

BLAND, JAMES FOX.—(*Provisional protection only.*)—"An improved method of supporting targets and protecting the platforms thereof from injury."

Two or more brackets of metal are to be fixed upon "an ordinary target platform." The brackets are furnished at their base with tongues, by means of which the target is fastened by bolts or screws. The brackets are notched, and the target may be fixed at any required distance above the platform. The platform is covered "with a superstratum of soil or clay to preserve it from injury or destruction by shot."

[Printed, 4d. No Drawings.]

A.D. 1864, January 12.—N° 85.

ASH, GEORGE.—(*Provisional protection only.*)—"Improvements in the manufacture of guns, cannon, and such like ordnance."

Cellular rings are proposed to be used "for the purpose of surrounding and strengthening tubes" for making guns. The cellular rings are cast in steel or other metal; they are forced on the tube by the aid of naphthline or other oil by means of a hydraulic press.

[Printed, 4d. No Drawings.]

A.D. 1864, January 13.—N° 94.

WILKINS, GEORGE.—"Improvements in the construction of breech-loading guns and rifles."

The breech is closed by a sliding plug of a compound construction, connected with the cover or lid that closes the loading chamber.

The sliding plug is made in two parts, a smaller plug being attached in front of the larger plug, so as to enter and close the breech, its motion being facilitated by a joint in the lid. The prolonged end of the lid has a hook which engages in a spring

catch in the rear of the loading chamber a spring is "fitted at the back of the rear or secondary plug" to diminish the recoil.

The mechanism may be applied to ordnance, the gun being loaded at the side. In that case a disc connected with a piston working through the breech and backed with india-rubber or elastic metal rings may be used to lessen the recoil.

[Printed, 8d. Drawing.]

A.D. 1864, January 13.—N° 95.

HART, GEORGE WILLIAM.—"Improvements in rifle targets, and signalling apparatus."

The target is made of a frame-work of wrought iron, and consists of a number of separate plates from 8 to 13 inches square. The plates are hung by hooks to the frame of the target in such a manner that their edges may overlap. When a plate is struck by a bullet it is made to move a lever, release a detent, and allow a weight to fall, which then moves a signal arm or disc and indicates the position of the hit upon the target.

[Printed, 1s. 8d. Drawings.]

A.D. 1864, January 13.—N° 98.

BLAND, JAMES FOX.—(*Provisional protection only.*)—"Improvements in targets and dummy targets."

The target is proposed to be made of a number of raised concentric rings, which will "prevent the spreading of the marks" made by the "splashing of the shot." Projecting arms are attached to the edges of "an ordinary dummy target," which are used in connexion with a central pointer to indicate the position and value of a hit made upon the shooting target.

[Printed, 4d. No Drawings.]

A.D. 1864, January 14.—N° 106.

THOMPSON, NATHAN.—"Improvements in apparatus for stopping bottles, jars, and other vessels, which improvements are also applicable to stopping the muzzles of fire-arms."

The improvements are based upon those described in the Specification of former Letters Patent, dated September 9, 1863, N° 2223, A stopper is made by attaching elastic discs to a right and left handed screw. By compressing the discs together, a ring of

valcanised rubber is made to expand readily and close the neck of a vessel or the muzzle of a gun in which the discs are placed; a disc of larger diameter than the orifice intended to be closed is attached to the axis of the screw, and is pressed upon the neck of the vessel or muzzle of the gun.

[Printed, 10*d.* Drawing.]

A.D. 1864, January 14.—N° 108.

THOMPSON, JAMES.—(*Provisional protection only.*) — “Improvements in the manufacture of tubes and barrels for fire-arms and ordnance, and in apparatus or machinery to be employed therein.”

The improvements are described as referring to those which were the subject of former Letters Patent, dated April 24, 1863. A block of steel has a hole punched through its centre by means of a powerful steam punch. It is then taken to a tilt hammer and drawn out with an enlarged part to form “the lump” of the intended barrel or tube. It is then again punched in a direction, the reverse of that in which it was first punched, and so the size of the bore is “enlarged and regulated.” The form of the lump is given by stamping apparatus.

[Printed, 4*d.* No Drawings.]

A.D. 1864, January 18.—N° 130.

BONNEVILLE, HENRI ADRIEN. — (*A communication from Leon Lambin and Toussaint Theate.*)—(*Provisional protection only.*) — “Improvements in adjusting daggers to revolvers and other pistols.”

The dagger is to be attached to the pistol by means of a projecting part which enters into the stock, and is fastened by springs, or it may have a hollow handle connected with a ring which is fitted on the muzzle of the barrel.

[Printed, 6*d.* Drawing.]

A.D. 1864, January 19.—N° 139.

THOMPSON, JAMES.—“Certain improvements in the manufacture of fire-arms and ordnance for military, naval, and other purposes.”

A block or billet of iron or steel is placed in a machine "fitted" with a punch or punches so arranged that a blow or a succession of blows may be given to the metal."

The punches may be made of a taper shape, and the block, which is heated, is confined "in an adjustable die or support." The punched piece called a "mould" is placed "under a suitable press for forcing it through a suitable clearing punch," or "two punches acting in contrary directions" may be used for "regulating and clearing the hole." The mould is re-heated and hammered or swaged, and a lump may be formed for the solid breech. The mould is then passed through suitably grooved rollers to give it "by progressive gradation the required form, as described in the Specification of prior Letters Patent, dated April 24, 1863, N^o 1023."

[Printed, 1s. Drawing.]

A.D. 1864, January 19.—N^o 141.

BURR, DAVID AUGUSTE.—(*A communication from George Ferriss.*)—"Improvements in cannon."

The gun is built up by forcing steel hoops on a central tube. The central tube is made by welding together discs, which are formed by coiling bars of iron of varying degrees of softness, the soft bars being so placed as to be in the centre and the hard bars on the outside of the disc, when coiled and welded. Bronze or soft alloy may be used instead of soft iron to form the centre part of the tube, which gradually increases in hardness from the centre to the circumference.

Steel bands or hoops are driven upon the central tube, and are fastened by "key rings."

A charging chamber is formed in the rear of the central tube larger in diameter than the bore of the gun; it is closed by a screwed plug which works in supports attached to the breech end, and when withdrawn it may be moved on one side.

A packing flange is used with the breech plug to make a gas-tight joint.

The powder charge is ignited in the centre part.

[Printed, 1s. Drawing.]

A.D. 1864, January 20.—N^o 153.

MCHAFFIE, NEIL.—"Improvements in the manufacture of articles from cast iron."

Cast iron of a very hard nature, by preference "white hæmatite pig, or a mixture of this with mottled or grey hæmatite pig," is used for projectiles, plates, slabs for batteries, and for other purposes. The metal is cast in a mould of fire-clay, kept heated in a furnace and allowed gradually to cool in from 30 to 72 hours, or longer for large sizes. If it is desired to give great hardness to the metal it may be hardened "by reheating and plunging, as is practised when hardening steel."

[Printed, 4d. No Drawings.]

A.D. 1864, January 23.—N^o 182.

CLARKSON, THOMAS CHARLES.—"Improvements in ordnance and in applying certain cylinders and tubes for forming projectiles and recoil springs, which improvements are applicable for forming vessels for war and pillars in deep water."

An outer case or cylinder, which is put on outside the muzzle of a gun, is blown from it as a projectile. Combustible materials, or fulminating or explosive compounds, may be attached to the cylinder, or spikes, or hooks made to project from it. Tubes for guns are made by coiling round sheet steel so as to form a tube. The tube may be fitted in a cast-iron gun as a lining. Fire-boats are fitted with pumping apparatus for discharging liquid fire.

Towers or pillars are built up in sections and are floated to a given point and there sunk to enable submarine operations to be carried on.

[Printed, 2s. 4d. Drawings.]

A.D. 1864, January 25.—N^o 217.

BESSEMER, HENRY.—"Improvements in the manufacture of projectiles."

The rolls used are made as described in the Specification of prior Letters Patent, dated January 26, 1861, N^o 216, for rolling spherical shot, having "the grooves around the rolls formed with an equal amount of indentation on both sides of the grooves. The rolls may in some cases have their axes inclined to one another, and in some cases four rolls may be used together, two having their axes horizontal and two vertical, the four grooves forming a spherical space, in which the spherical ball is compressed and rolled."

In order to form the projectiles a steel or malleable iron ingot is cast of the required size, which may be such as to make several projectiles. The ingot is then hammered or is squeezed "by hydraulic pressure, so as to consolidate the mass." It is then made into a solid cylinder by means of swages or rolls, and afterwards divided by saws or cutters into suitable lengths, which are made into a spherical shape by heating them and pressing them in dies. These may be worked by a hydraulic press, as described in the Specification of prior Letters Patent, dated June 9, 1863, No. 1439; a suitable intermittent motion may be given by an ordinary force pump. The spherical balls may be finished by rolling them in the grooved rolls above referred to, or by rolling them between two grooved tables pressed together by a screw or by hydraulic pressure. The annular grooves in the tables "may be so placed as to intersect each other at any desired angle," or they may be concentric. Two or more spherical balls may be rolled at the same time, "blank pieces or cold shot" being placed between the heated spheres. Both spherical and elongated hollow projectiles may be made by progressively stamping a disc or plate of steel and forcing it through a bell-mouthed die; or cylinders may be punched and divided into suitable lengths and be welded or pressed in suitable dies. Rolls of the required relative shape are used for rolling elongated projectiles.

[Printed, 1s. Drawing.]

A.D. 1864, January 30.—No 257.

HADDAN, JOHN COOPE.—"Improvements in fire-arms, and in artillery and projectiles for the same."

Rifled barrels are so formed that the interior of the barrel consists of "three or more plane or very slightly concave surfaces," constituting the lands, and "three or more other surfaces, being curved sweeps or grooves" of the depth required to provide for windage and to give rotation to the projectile.

Guns are made with "wrought-iron or hammered steel linings" fixed in cast steel tubes, and strengthened with an outer wrought or cast iron jacket.

Trunnions are made of a diameter about equal to the external diameter of the gun, and of such a comparatively narrow width that the gun block need not have an excess of metal cast on or

formed on it, to make the trunnions. In some cases the trunnions are made of a half-moon shape.

Hollow elongated projectiles are fitted with projecting rods or strikers, which project from their front parts, and on striking the ground directly or aslant they effect the ignition of the bursting charge.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, January 30.—N° 259.

BRAZIER, RICHARD.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms."

Barrels which are turned down or "tilted" to receive the charge are to be fastened by a spring locking bolt which is connected with the trigger guard, and is drawn back by it to release the barrels. The end of the bolt is bevelled, and when the barrels are pressed down a projection on the lump forces back the spring bolt, which is then engaged in a recess in the lump. The locking bolt may be secured in its place by means of a small vertical bolt.

[Printed, 4d. No Drawings.]

A.D. 1864, January 30.—N° 260.

HUGHES, EDWARD THOMAS.—(*A communication from Henry Doty and William Porter Downer*).—"Improvements in submarine batteries."

Submarine batteries, mines, or charges are made to act below the water by means of a tube fitted into a ship's bows. The tube has suitable water-tight covers and valves. The explosive charge is attached to a rod which is moved through a stuffing box in the tube, and at the time when it is required to be exploded it is thrust through the tube and made to project from the ship.

[Printed, 8d. Drawing.]

A.D. 1864, January 30.—N° 261.

WHITWORTH, JOSEPH.—"Improvements in projectiles."

Hollow projectiles intended "for penetrating substances such as armour plates" are made with a cylindrical hole formed partly through them, a thickness of metal being left at the bottom of the hole, about equal to that of the sides of the projectile; or the hole "may be made through," and a screw plug inserted.

The cavity is partly filled with powder, and a "hardened steel" tempered cylinder" is inserted in front of it. The charge is ignited by a percussion striker. When the projectile hits an armour plate the charge is fired and the steel cylinder is driven forward, and with it segmental pieces that in some cases are placed between it and the powder. In the case of large projectiles the steel cylinder may be made to act as a shell.

Projectiles for large bore rifles, such as the Enfield rifle of 1853 pattern, are made without a wooden plug for the rear cavity. A cavity is made in the front part of the projectile, which is filled with wood. A bullet of the service weight, but of increased length, is thereby made, which is to be fired from a rifle of a turn of about one in 25 inches.

[Printed, 6d. Drawing.]

A.D. 1864, February 1.—N° 269.

HUTCHINSON, WILLIAM NELSON.—"Improvements in the" construction of cylinders of hydraulic machines, applicable also" to the construction of ordnance and other articles or vessels" subject to pressure from within."

Barrels for guns and cylinders for hydraulic machines are constructed of steel or other metal tubes or cylinders, fixed concentrically, one within the other. The tubes have ribs upon them, and are firmly fastened together in such a way as to leave spaces between the tubes. These spaces are filled with water or other liquid, which may be injected under pressure. It is preferred that the pressures of the liquids shall be "gradually greater as they" approach the innermost tube."

The touchhole is made in a strong circular bolt coinciding with the axis of the piece and serving as a support for the concentric tubes.

[Printed, 10d. Drawing.]

A.D. 1864, February 1.—N° 271.

HARRISON, EDWARD.—"Improvements in breech-loading" fire-arms."

The barrels are "tilted" to receive the charge, and are fastened by a catch on a lever fixed in front of the trigger guard. By depressing the lever handle the catch is withdrawn from a curved "locking piece" attached to the under side of the barrels, and

the barrels are released. Connected with the lever are two "lifting pins or pegs," which are caused to move upwards and raise the hammers to half-cock. The charges are then inserted, and the barrels being pressed down are locked by the catch.

[Printed, 10d. Drawing.]

A.D. 1864, February 4.—N^o 292.

DRAYSON, HENRY EDWIN.—"An improvement in the manufacture of gunpowder."

In manufacturing gunpowder a mixture of sulphur, charcoal, and saltpetre is placed in a box or vessel, and steam is injected, but only in quantities sufficient to give "adhesiveness to the composition." It is then ground in the mill and formed into "mill cake." The mill cake, before it becomes set and hard, is passed through a sieve or sieves of the required mesh to form "grains." To the last sieve a rotatory motion is given; the grains are thus formed without causing dust. "When the grain is sufficiently dry it is glazed in the usual way."

[Printed, 4d. No Drawings.]

A.D. 1864, February 4.—N^o 293.

KEY, GILBERT TROWARD.—(*Provisional protection only.*)—"An improvement in percussion caps, in lubricating wads, and in tubes for ordnance."

The improvement is stated to consist "in the employment of zinc alloyed with lead, or of zinc softened by heating after being rolled," as a substitute for copper "now employed for the manufacture of caps, wads, and tubes for fire-arms and ordnance."

[Printed, 4d. No Drawings.]

A.D. 1864, February 4.—N^o 297.

NEWTON, THOMAS.—"Improvements in breech-loading fire-arms."

The barrels are "tilted" to allow the cartridges to be inserted in the breech end of the barrels. A recess is made in a projecting piece attached to the under side of the barrels, which when they are shut down force back a sliding spring bolt, having a bevelled front part, which is pushed by the spring into the recess. The barrels are released by the action of a "thumb piece working in

" a slot on the top of the break-off." When the thumb piece is pushed forward it moves a lever and draws back the spring bolt, and so releases the barrels.

[Printed, 8d. Drawing.]

A.D. 1864, February 8.—N° 325.

NAPIER, RICHARD HENRY.—"Improvements in the construction of screw steamers for naval warfare."

Vessels suitable for carrying heavy guns with a light draught of water are constructed "with lateral projections or bulges in their top sides," and have "a sudden increase of beam extending for about 21 feet before and abaft the centre," so as to present an inclined surface to shot.

The gun platform is in the midship part of the vessel, and is protected by an iron or steel "elliptical roofing" arched over it.

[Printed, 8d. Drawing.]

A.D. 1864, February 9.—N° 337.

CUNNACK, RICHARD JOHN.—"Improvements in the manufacture of cartridges for blasting and projectile purposes."

The explosive composition which is used is subjected to great pressure in a suitable press, so as to compress it as much as possible. Liquid hydrocarbons or gummy or resinous matters may be mixed with the composition. The compressed hard composition is enclosed in flexible sheet metal, or is coated with a waterproof composition.

[Printed, 4d. No Drawings.]

A.D. 1864, February 10.—N° 353.

CUNNINGHAM, HENRY DUNCAN PRESTON.—(*Provisional protection only.*)—"Improvements in the fittings of gun carriages, and methods for working guns."

A compressor for a gun carriage is proposed to be made by fitting metal plates or boxes to the "chock or cross piece" of a carriage, mounted on slides. Screws are attached to the plate or box, which when turned press a block of wood against the slide, and so break the motion. "A chock or breast hook" is fitted to the ship's side, by which the carriage is stopped when it is run out, instead of throwing the strain on the pivot.

340 FIRE-ARMS AND OTHER WEAPONS,

Leading tackles are led from the after end of the gun slide to the beams overhead to raise it and assist in "training the gun."

[Printed, 4d. No Drawings.]

A.D. 1864, February 12.—N° 371.

GEDGE, WILLIAM EDWARD.—(*A communication from Eugène Moreau.*)—"An improved fire-arm and projectile."

A harpoon or spear projectile is fired from a barrel by means of a cartridge. Attached to the projectile is a cord or string, which is uncoiled when it is fixed, so that the object hit may be secured by the cord or string.

[Printed, 6d. Drawing.]

A.D. 1864, February 16.—N° 397.

PIGOT, RICHARD ST. LEGER.—(*Provisional protection only.*)—"Improvements in breech and muzzle loading cannon, guns, and other fire-arms, and in projectiles to be used therewith."

The breech of the breech-loading gun is to be closed with a solid screw plug, which is turned by a handle. Hollow projectiles may be made with a number of perforations, in which plugs are inserted when the projectile is heated. When it cools the metal shrinks, and the plugs are fastened, and when the projectile is burst as a shell the plugs are scattered. Diamond-shaped segments of metal may be placed in the shell. Hollow projectiles are made with the interior rifled, so that the air may impart rotation to the projectile as it is driven forward through the air.

[Printed, 8d. Drawing.]

A.D. 1864, February 17.—N° 409.

AISTHORPE, JOHN.—(*Provisional protection only.*)—"Improvements in the construction of ordnance and fire-arms, and in projectiles to be used therewith."

The bore of the rifled gun is proposed to be made "of a polygonal form or section, with such a number of sides as to approach nearly to a circle, the alternate sides of the polygon being left equal, and those between them being slightly grooved along each angle, so as to leave a narrow "side between the "two grooves."

For large guns projectiles coated with soft metal or alloy may be used; they are formed so as "to fit" the rifling of the gun.

[Printed, *4d.* No Drawings.]

A.D. 1864, February 19.—N^o 437.

HALE, WILLIAM.—"Improvements in ordnance."

Guns are rifled with round bores produced by "a process of round boring." The interior of the gun is formed by "a round bore, so that in every transverse section the figure shall be a circle of the same diameter, and yet all the longitudinal lines in the surface of the bore shall be spiral." The gun when bored is placed in plummer blocks "fixed on the upper surface of the slide bed of the lathe, the gun being thereby free to turn on its longitudinal axis." Motion is given by suitable gearing, for example, one "turn in the time the gun is moving towards the cutter throughout the entire length of the bore." The gun is thereby turned on its axis and moved towards the cutter while the boring bar is revolving. A series of sections through the axis of the gun, made at various distances, would show a series of eccentric circles. In some cases the gun is rifled by making its bore of such a sectional form that it is made up of parts of the circumferences of three circles.

A wrought-iron gun is made by "twisting flat bars of iron or steel" when heated round a cylinder of iron or steel, in such a manner that "one turn of the twist shall be equal to six or more diameters of the bore." For large ordnance two layers are twisted in contrary directions.

[Printed, *1s. 4d.* Drawings.]

A.D. 1864, February 22.—N^o 445.

RIGBY, JOHN.—(*Provisional protection only.*)—"Improvements in the projectiles and wads of fire-arms, and in apparatus for manufacturing the same."

Mechanically fitting wads, corresponding with the bore of the rifle barrel in which they are used, are proposed to be made of sheet metal, wood, ebonite, or other materials. Mechanically fitting bullets may be made by casting a rod of the required external shape, and cutting it up into suitable lengths. The cavities in the rear of bullets may be filled with plaster of Paris, clay, or other earthy substances.

[Printed, *4d.* No Drawings.]

A.D. 1864, February 25.—N^o 469.

BURTON, BETHEL.—(*Provisional protection only.*)—"Improvements in breech-loading and revolving fire-arms and cannon and metallic cartridges."

A revolver pistol is proposed to be made with a cylinder, of which the bore "does not run through, but a smaller hole is made through the cylinder, which forms a shoulder, and down on to this hole, and in the base of the cylinder, a slit is formed." Metallic cartridges are used, and the hammer strikes the upper side of the cartridge, and the shoulder prevents it from being forced back.

A breech-loading gun is proposed to be made "with a sliding breech pin, supported by sectional screw threads," male and female. The pin closes the chamber, and is fastened by a bayonet joint "or other suitable means." The breech-loader may be used as a muzzle-loader, by removing the striker used for exploding the cartridges inserted in the breech, and using the ordinary nipple.

Cannon may be made of cast-iron by placing a jacket of wrought iron upon a cast-iron tube, the trunnions being formed on the jacket. The breech is closed by a screw plug fastened by means of a sectional screw.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, February 26.—N^o 481.

SHAW, CHRISTOPHER.—"An improvement in the manufacture of malleable shot, and in apparatus for that purpose."

Shot are made of malleable iron or steel by rolling the metal by means of three rolls. The three rolls are mounted in "strong metal frames," and are arranged "in a triangular form suitably grooved and rotating in the same direction about their axes." The metal is rolled in the space formed by the grooves in the three rolls.

[Printed, 10d. Drawing.]

A.D. 1864, February 27.—N^o 492.

SHEPARD, EDWARD CLARENCE.—"Improvements in breech-loading fire-arms."

The improvements are based upon those described in the Specification of prior Letters Patent, dated August 27, 1863, No. 2820,

which related to a breech-loading arm, used with metallic cartridges. A spring hook or catch was employed to extract the exploded cartridge case. When ordinary cartridges, which are exploded by a cap placed on the nipple, are proposed to be used, the extractor hook is dispensed with, and an ordinary nipple is used. A moveable breech-piece closes the rear end of the barrel, and is provided with a chamber "to receive the ordinary service " ammunition, or even loose powder." The nipple may be so fixed that its fire passes down a touch-hole made through the breech-piece.

[Printed, 10d. Drawing.]

A.D. 1864, March 2.—N° 522.

DAVIES, GEORGE.—(*A communication from Benjamin Franklin Joslyn.*)—"Improvements in breech-loading fire-arms."

The breech end of the barrel is closed by a breech block which has a lateral movement upon a vertical axis, and when in its place, is fastened by a spring bolt working in the block. Metallic cartridges are used, having the explosive composition in a flange in the base of the cartridge. A spring striking pin is driven against the flange to explode the charge. When the cartridge is exploded, the breech block is moved laterally, and gives motion to a sliding extractor which withdraws the spent cartridge partially from the breech, so that it may be easily removed by hand.

[Printed, 8d. Drawing.]

A.D. 1864, March 2.—N° 524.

NEWTON, ALFRED VINCENT.—(*A communication from Silvanus Jenkins Macy.*)—"An improved construction of percussion " pouch."

The pouch consists of "a flat box of nearly elliptical form;" within it "is placed a rotating circular plate, provided with a " number of holes of proper size and form for the reception of " percussion caps, such holes being arranged in a helical or " convolute form." The plate is moved by a ratchet motion, affixed to the back of the plate, and presents "the caps one at a " time opposite to a spout, through which they are discharged " by means of "a spring and pin, which also act on the ratchet to " prevent the plate from turning backward."

[Printed, 8d. Drawing.]

A.D. 1864, March 3.—N° 530.

YVOSE-LAURENT, LOWINSKI.—(*Provisional protection refused.*)—"The application of impervious tissue for manufacturing "encampment carpets, for the use of the armies."

A camp cloth for the use of soldiers in the field is proposed to be made of waterproof cloth. It is to be about 6 feet long and 2½ feet wide, and may be folded to go in the knapsack.

[Printed, 4*l.* No Drawings.]

A.D. 1864, March 9.—N° 594.

THOMPSON, NATHAN.—"Improvements in apparatus for "stopping bottles, jars, and other vessels, which improvements "are also applicable to stopping the muzzles of fire-arms."

The improvements are based upon those described in the Specifications of prior Letters Patent dated respectively, September 9, 1863, No. 2223, and January 14, 1864, No. 106, relating to stoppers for closing the necks of vessels and muzzles of guns, by means of an expanding vulcanised rubber ring, pressed between two discs. Instead of the tube "around which the vulcanized "india-rubber ring is placed being carried by a disc," the upper end of the tube has "a projecting flange" of larger diameter than the orifice to be closed, and there is an inner tube sliding in the upper tube, which also has a flange, and by drawing the two flanges together by the action of a screw the ring of rubber is expanded and closes the orifice or muzzle.

[Printed, 10*l.* Drawing.]

A.D. 1864, March 12.—N° 624.

WALLIS, CHARLES EDWIN. — "Improvements in revolving "fire-arms."

The revolving cylinder has long chambers formed in it, each one capable of containing two charges. Two rows of nipples are attached to the cylinder, the front row discharge the front charges, and the rear row the second or rear charges in the chambers. The hammer is made moveable, so that when it has fired the front row of charges it may be moved back, and hit upon the rear row of nipples.

[Printed, 8*l.* Drawing.]

A.D. 1864, March 12.—N° 625.

CLARK, GEORGE. — (*Provisional protection only.*)—"Improve-
ments in the construction of guns and projectiles, and gun
carriages, and in the manufacture and use of materials employed
in their construction."

The breech of the gun is to be closed by a hinged block, turning on a hinge at the side of the gun, and raised by a heavy counterbalancing arm. The gun may be made in two parts, the breech part being supported upon a separate carriage from the front part of the gun. The two parts are to be connected by a screwed hoop. A separate breech cylinder may be used to contain the charge. Built up guns are made of a tube strengthened with "narrow rings" of steel or copper. Hard metal projectiles may be covered with a soft metal or "plastic material;" they may have a false front, which is crushed in when a hard object is hit. Compound projectiles are to be made of metals of different specific gravities, or of metal and wood. Projecting ribs of soft metal are used to hold a projectile in the gun, and to prevent it from starting when the gun is depressed.

[Printed, 8d. Drawing.]

A.D. 1864, March 15.—N° 663.

CAUDWELL, HENRY.—"Improvements in projectiles."

The projectiles are made with fronts of a pyramidal shape, having a triangular face, which may be flat or concave. The sides of the pyramidal head may also be made concave. The cylindrical part of the projectile may be fluted with flutes having sharp edges, "so as to cut their way down the bore of the gun when it has become foul." Rings or belts of soft metal are attached to the projectile, which are driven into the rifling grooves when the powder is exploded.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, March 16.—N° 670.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—(*A communication from Pierre Elie Jules Fleury.*)—"Improvements in fire-arms."

A safety catch or bolt is applied to the lock of a gun to prevent it from being cocked or discharged accidentally. A steel bolt is passed through the locks and prevents the cocks from being

moved. The bolt is moved so as to free the action of the lock by means of a "key similar to a watch key," without which "it is impossible to cock or uncock the gun."

[Printed, 8d. Drawing.]

A.D. 1864, March 21.—N° 715.

HUTCHINS, HENRY EDWARD. — (*Provisional protection only.*) — "Improved breech-loading cannons or guns, and improved projectiles adapted to be used therewith, but capable of being used with other cannons or guns."

The breech of the gun is to be closed by a wedge-shaped breech block moved sideways by a screw. The projectile is to have an expanding ring or belt of soft metal, or it may be made plain.

[Printed, 6d. Drawing.]

A.D. 1864, March 22.—N° 722.

BOUSFIELD, GEORGE TOMLINSON. — (*A communication from William Judson.*) — "Improvements in apparatus used with gun carriages."

The trunnions of the gun are supported in bearings working in slides attached to the gun carriage. Blocks of vulcanized india-rubber are fitted before and behind the bearings to resist the action of the recoil. Two metal rods are connected with the carriage, and pass through india-rubber rings, which are compressed by the action of the recoil and prevent the carriage from moving too far, the rods being fastened to the deck or to some other fixed point of resistance.

[Printed, 8d. Drawing.]

A.D. 1864, March 24.—N° 752.

MATHEWS, SAMUEL. — "Improvements in breech-loading fire-arms, and in cartridges, and in converting breech-loading into muzzle-loading fire-arms."

The barrels of "drop-down" guns are locked by means of "plugs passing through the break-off and entering the open breech ends of the barrels." The plugs are "connected together at the back of the break-off, and are moved into and out of the ends of the barrels by means of a lever on the tang of the break-off." The lever moves sideways and works a crank connected by a link to the piece which joins the plugs together.

The plugs may be moved by means of "a curved wedge-shaped block," which acts "against the piece which connects them." The barrels may be locked by means of "a block turning in a vertical plane on a joint, and shutting down into a trough-like cavity" in the rear of the barrels. A bolt slides horizontally in the block, and is moved by a "sliding piece on the top of the block."

Breech-loaders may be made to serve as muzzle-loaders by inserting in the breech cylinders of metal "having a flange at one end and a screw cap at the other."

A telescope ramrod is made in parts, which slide within one another, and are fastened by springs.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, March 26.—N° 760.

BOUSFIELD, GEORGE TOMLINSON. — (*A communication from Stephen Wood.*)—(*Provisional protection only.*)—"Improvements in revolver fire-arms."

The locks of revolvers are to be made so that either the hammer may be retained at half-cock and then be raised by hand to full-cock, or the hammer may be raised and let fall by the act of pulling the trigger.

[Printed, 4d. No Drawings.]

A.D. 1864, March 28.—N° 765.

KIRRAGE, WILLIAM. — (*A communication from G. B. Naglosh.*)—(*Provisional protection refused.*)—"An improved breech-loading cannon protected from overheating and capable of an immediate withdrawal of the exploded cartridge case."

The gun is proposed to be made with "a casing" surrounding the barrel, through which water is made to flow. Strengthening rings are to be placed upon the muzzle and on the breech ends of the gun, and are connected by bars.

[Printed, 4d. No Drawings.]

A.D. 1864, March 29.—N° 775.

EVANS, ISAAC MARK. — (*Provisional protection only.*)—"Improvements in blasting for mining and other purposes, applicable also to discharging projectiles, and in the apparatus used in connection therewith."

Carburetted hydrogen gas or pure hydrogen gas is to be used as an explosive agent for firing guns and blasting purposes. Tin or other metal tubes are to be charged with the gas and closed by soldering their ends. The gas may be transported in "strong bags of india-rubber or gutta percha."

[Printed, 4d. No Drawings.]

A.D. 1864, March 30.—N° 737.

TREADWELL, DANIEL. — "Improvements in constructing hoops to be used in the manufacture of cannon and other similar tubular or cylindrical structures."

Hoops intended for hooping built-up guns or cast-iron guns ought to be so prepared as to have a "high degree of elasticity with the ability to resist permanent extension from any force to which they are intended to be subjected in use." The hoop is formed of "a broad flat bar, coiled spirally, welded and forged into the proper shape." "When cold or at a temperature decidedly below annealing point" it is placed upon a mandril and hammered until the iron becomes hard and condensed, like that of "hard wire." In some cases the hoop may be pressed by rollers to produce the same effect. The hoop, when cool, or when heated to 600° F., is gradually expanded by driving a conical plug between circular swages placed within the hoop; it is gradually enlarged $\frac{1}{100}$ th, or, if the iron be tough and soft, $\frac{1}{20}$ th of its diameter. The hoop is then turned and finished to the size required to give the necessary compression to the gun and tension to the hoops, being from $\frac{2}{1000}$ to $\frac{3}{1000}$ less in diameter than the part of the gun compressed. The hoop, when finished, is heated in an oven or muffle, "but not up to the annealing point," and is then put in its place on the gun and allowed to cool.

[Printed, 1s. Drawings.]

A.D. 1864, April 2.—N° 823.

WALKER, JOHN. — (*Provisional protection only.*) — "Improvements in working guns, and matters relating thereto."

Guns are proposed to be mounted on platforms supported by pistons or rams connected with hydraulic cylinders. The guns are to be so arranged that their weights may be made to balance, so that as one gun descends to be loaded another gun may be raised to be discharged.

[Printed, 4d. No Drawings.]

A.D. 1864, April 4.—N° 838.

BROWN, THOMAS. — “Improvements in military and other
“ knapsacks or cases applicable as garments or receptacles for the
“ body, and in combination with other appliances as mattresses,
“ hammocks, life-buoys, pontoons, tents, and coverings for troops
“ and others in the field or camp, and for the protection of bodies
“ generally from exposure to the atmosphere.”

A cellular air mattress is made of waterproof material in several parts, one part that may be inflated forms a bed, another part forms a covering, and other answers as a hood to cover the head. Suitable rods or poles are used to support the mattress and make it serve as a kind of tent. It may be also adapted for use as a life-buoy or float and for forming rafts or pontoon bridges.

[Printed, 10d. Drawing.]

A.D. 1864, April 5.—N° 851.

CLARK, WILLIAM.—(*A communication from Robert Augustus Chesebrough.*)—“An improvement in cartridge boxes and percussion cap pouches.”

A rotating cylinder containing suitable compartments is fitted in a box or pouch. Cartridges or caps are placed in the respective compartments. The cylinder is “turned by a pawl attached to a
“ lever working upon a fulcrum pin on one side of the box.” As the cylinder is turned round the cartridges or caps are successively brought opposite a delivery spout made in the bottom of the box,
“ whence they are dropped one at a time as required for use.”

[Printed, 1s. Drawings.]

A.D. 1864, April 7.—N° 866.

HILL, WILLIAM.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms.”

The barrels of guns that “drop down” at the muzzle, or are tilted at the breech to receive the charge, are proposed to be locked “by means of two bolts working through the break-off,
“ and engaging in two holes or recesses situated respectively in
“ the rib between the barrels and in the recess underneath the
“ barrels.” The bolts are connected “with a bar at the back of
“ the break-off” and are urged by a spring. The bolts may be

withdrawn by a lever on the tang of the break-off, which works a pinion engaged in a rack connected with the bolts.

[Printed, 4d. No Drawings.]

A.D. 1864, April 7.—N° 869.

SNIDER, JACOB, junior.—“Improvements in breech-loading ordnance and projectiles.”

The improvements are in part based upon those described in the Specification of former Letters Patent, dated September 1, 1863, N° 2156. A hole is made in the breech of the gun to receive the breech block, but its edges are “not sloped off at the outer surface of the gun.” The weight of the breech block is reduced and it is caused “to retire from the barrel, face, or bore of the gun simultaneously with its being lifted out of its receptacle in the body of the gun.” The breech block is made to turn upon an axle placed eccentrically and parallel to the bore of the gun by means of a screwed handle. A “gas check” is fitted in front of the block; it has a portion of its interior annular face curved out, “so as to leave a recess all round the interior face.”

Projectiles are made with flanges corresponding to the rifling grooves of the gun; grooves are cut along “that portion of the flanges which most impinge on the riflings,” and a composition consisting chiefly of graphite is compressed into the grooves to act as a lubricator.

[Printed, 8d. Drawing.]

A.D. 1864, April 8.—N° 880.

FERGUSON, CHARLES AUGUSTUS, the younger, and FERGUSON, THOMAS.—“Improvements in apparatus for checking the recoil of gun carriages.”

Compressors consisting of “two strong metal plates” are attached to the upper and lower slides of a gun carriage respectively. The plates are drawn together by means of a right and left-handed screw. Between the compressor plates, and “occupying nearly the whole space between the slides, are two parallel blocks of wood or metal, having an oval indent in their centres; upon the middle of the right and left-handed screw shaft there is an oval block or cam, the revolution of which forces the blocks asunder against the two inner surfaces of the slides,” or the blocks may be forced asunder by wedges. The “duplex com-

"pressor" may be moved by a lever worked by a rope, or by a screw.

[Printed, 8d. Drawing.]

A.D. 1864, April 8.—N° 883.

GOODWIN, FRANCIS CORNELIUS.—"Certain improvements in 'sights' for small arms and ordnance."

A line of "platinum, gold, or other suitable metal or material" is marked as a sight line upon "a horizontal bar sight," such as "is known as Goodwin's horizontal bar sight." Or the line may be marked with a colour which contrasts strongly with that of the bar. Various kinds of lines may be marked upon the bar.

[Printed, 8d. Drawing.]

A.D. 1864, April 11.—N° 900.

DRONKE, ERNEST.—(*A communication from Edward Schultze.*)—"A new mode of manufacturing gunpowder, suitable for war, mining, and general purposes."

Gunpowder is made from woody fibres by cutting up wood into strips or cylinders of suitable sizes, and cleansing the fibres by boiling and washing them, and treating them with chloride of lime and salt. They are then steeped in an acid bath composed of 40 parts of nitric acid of sp. g. 1·48 to 1·50, mixed with 100 parts of sulphuric acid of sp. g. 1·84. The woody grains are afterwards drained in a centrifugal machine, then soaked in running water for two or three days, then boiled in a weak solution of carbonate of soda, and then again soaked in running water. The grains are then saturated with salts containing oxygen and nitrogen, such as nitrate of potash and nitrate of barytes, 22·5 parts of nitrate of potash and 7·5 parts of nitrate of barytes are dissolved in 220 parts of water at 112° F., and are then stirred up with 100 parts of the woody grains, and then dried in a warmed chamber at 90° to 112° F. Nitrate of potash may be used alone. The last operation may be performed at a later period than those first described.

[Printed, 4d. No Drawings.]

A.D. 1864, April 12.—N° 910.

PIGOU, FREDERICK ALEXANDER PRESTON.—"Improvements in the construction of powder flasks."

The supply of gunpowder to the nozzles of powder flasks is regulated by using a spring "slide placed immediately beneath the circular plate which forms the head or top of the flask." It moves in guides and has "an opening corresponding to the aperture in the plate over which the nozzle is fixed." The slide is moved by pressing a button or shank attached to it and is pressed back by its spring.

[Printed, 8d. Drawing.]

A.D. 1864, April 13.—N^o 929 (* *).

BURCHALL, JOHN, and BORROWS, EDWARD.—(*Provisional protection only*).—"Improvements in arming war vessels."

"In applying to such vessels an instrument of attack which we call a moveable ram, to distinguish it from the rams ordinarily used, which are fixtures to or on portions of the vessel. Our ram, on the contrary, is formed to thrust forwards like a punch with rapid action, which may be repeated in a succession of blows, so that if the vessel with this moveable ram be sufficiently near an enemy's vessel it will punch holes in it and so destroy it, or so bruise it as to render it leaky and unserviceable; and we put the ram in motion by the agency of steam or chemical gases, or air, or water pressure, in any of the known modes of applying power or any convenient combination thereof, and these rams may be applied above the water line or below it in any convenient part of the vessel, suffing boxes being provided when the rams are below the water line to keep out the water, and the rams may be of any desirable section, round, square, oval, triangular, or polygonal, and flat-headed, pointed, or cupped."

[Printed, 4d. No Drawings.]

A.D. 1864, April 15.—N^o 950.

RENDEL, GEORGE WIGHTWICK. — "Improvements in the means of checking the recoil of gun carriages."

A "compressor" is made by connecting "two or more rubbing plates" by a clamp plate "in such a manner that screws acting through the opposite ends of the clamp plate" either press the plates together "so as to make them grip tight upon the opposite surfaces of the intervening bar, or free them." One of the clamp screws is moved "by a lever the end of which is connected with the gun carriage, the other is used as an adjusting screw to

“ regulate the amount of grip.” The compressor is so adjusted that the carriage has “ a certain amount of free run,” and is then brought up by the compressor. Two or more compressors may be employed.

[Printed, 4d. No Drawings.]

A.D. 1864, April 20.—N^o 989.

HARRISS, JAMES PLAISTER.—(*Letters Patent void for want of Final Specification.*)—“ Improvements in projectiles.”

Curved grooves are proposed to be formed in the surfaces of elongated projectiles, and are made to extend along a part of the surface, and then end abruptly, or are turned aside at an angle. The gases of explosion will, it is said, rush along the grooves, and meeting with a resistance at the points where the grooves terminate, or are turned aside, will give rotation to the projectiles, which may be fired from a smooth bore gun.

[Printed, 4d. No Drawings.]

A.D. 1864, April 21.—N^o 1004 (* *).

THOMAS, LUKE.—(*Provisional protection only.*)—“ A lifting “ battery applicable to ships and forts.”

The invention consists “ in a lifting and lowering gun platform “ for the working of guns.”

“ I propose to effect the working of the platform by the application of the pressure of steam, water, gas, or other elastic “ fluid, and to do so in the following manner, that is to say :—I “ fit to the piston rod or piston rods of a steam cylinder or “ cylinders, hydraulic ram or rams, or cylinders of other apparatus for applying fluid pressure, a platform or table whereupon “ the gun is placed on a revolving carriage, and I so arrange that “ when the piston is at the bottom of its stroke, the platform “ shall rest with its under side on the top of steam, hydraulic, or “ other cylinder, in which position the gun is loaded, and when “ it is desired to raise or lift the gun to the requisite height, the “ pressure is admitted or applied on the under side of the piston “ by any convenient arrangement of valves and the piston will “ be thereby put into action, thus lifting or raising the platform “ and gun.”

When the invention is applied “ to ships or gunboats, the deck “ or decks is or are cut away to an extent equal to the size of the

" platform, and vertical guide rods may be employed, secured at
 " their upper ends to the upper deck, and secured at their lower
 " ends to the lower deck, or otherwise conveniently secured. The
 " platform being provided with grooves or recesses at its outer
 " edge in number corresponding with the guide rods employed.
 " This arrangement will serve to steady and keep the gun plat-
 " form in position during its upward motion. The gun having
 " been lifted or raised to its proper position and discharged the
 " steam or other pressure is removed from the under side of the
 " piston, and the platform returns to its original position with its
 " under side on the cylinder or cylinders, when the gun can be re-
 " loaded, or the gun can be run off in case of its being disabled
 " and immediately be replaced by another. The platform may be
 " also used for mortar firing. In heavy weather when for other
 " reasons the guns are not required on deck, they can be run off
 " the platform and the platform run up close to the deck, and
 " there securely locked."

" I propose, in some cases," "to adopt fixed piston rods and
 " moving cylinders, and in these cases the platforms will be
 " attached to the cylinders instead of to the piston rods."

[Printed, 4d. No Drawings.]

A.D. 1864, April 29.—N° 1079.

CORRY, JOHN.—(*Provisional protection only.*)—"Improvements
 " applicable to projectiles to be discharged from smooth-bored
 " ordnance and small arms."

Projectiles intended to be fired from smooth-bore guns are to be
 grooved in a spiral direction. The object is to "obtain rotatory
 " motion on its longitudinal axis by the force of the expansive
 " gases caused by the ignition of the charge."

[Printed, 4d. No Drawings.]

A.D. 1864, May 2.—N° 1108.

NEWTON, ALFRED VINCENT.—(*A communication from Hermann
 August Jaque Gruson.*)—"Improvements in the manufacture of
 " projectiles."

Hollow and solid projectiles are made of "chilled cast-iron."
 " The metal, which is by preference used, is a mixture of white
 " and grey best charcoal iron." The metal is cast in an iron
 mould consisting of one or more pieces, "the surface of the pro-

“jectile is thus chilled in the casting and a steel-like tenacity is thereby imparted to it.” It is preferred to make the moulds in two parts, so that the fore part of the projectile is cast with a chill and the cylindrical part is cast in a mould of sand or loam.

[Printed, 10d. Drawing.]

A.D. 1864, May 4.—N° 1122.

PARFREY, YOUNGS. — “Improved machinery for filling, closing, and finishing cartridges.”

Self-acting charging apparatus, so arranged as to perform eight operations, is mounted upon eight arms in a frame attached to a table. First the cartridge is passed through a hole in the table into a die, and by the action of a treadle it is pressed to the required size. The frame carrying the cartridge is turned through one-eighth of a circle, and an implement is brought down that presses the head of the cartridge on to the table, it is then moved on and filled with powder, then a wad is inserted, and the other successive operations are performed, the cartridge being successively moved under eight arms, so as to bring their respective implements into operation in succession.

[Printed, 10d. Drawings.]

A.D. 1864, May 6.—N° 1148.

HIRST, WILLIAM.—“Improvements in machinery to be employed in the manufacture of paper or linen spool tubes, which machinery is also applicable for the manufacture of cartridge cases.”

The improvements are based on those described in the Specification of prior Letters Patent, dated September 9, 1862, N° 2481. The paper intended to form the cartridge is wound on to a spindle made of two parts, or two short spindles, which are made to advance end to end, so as to be close together while the paper is wound on them. They then separate and are withdrawn from the paper tube, which falls on to a carrier or apron. One or both the parts may be bored to allow air to enter the tube, when the spindles are withdrawn. Paste is supplied from a self-acting feeding hopper.

[Printed, 8d. Drawing.]

A.D. 1864, May 7.—N° 1163.

POWELL, WILLIAM.—“An improvement or improvements in “ breech-loading fire-arms.”

Barrels which are tilted at the breech or “dropped down” at the muzzle are fastened by means of a lever quadrant. The short arm of the lever when the barrels are shut down is made to bear “upon a projecting block at the breech end of the barrels,” and so fastens them. The barrels are liberated by raising the long arm of the lever which lies upon the top of the stock so as to draw the short arm “from off the said projecting block to release the “barrels.” When the barrels are being shut down, they press back the short arm of the lever into a recess in the break-off, and when they are home a spring acting on the short arm presses it forward so as to bear on the projecting blocks.

[Printed, 1s. Drawings.]

A.D. 1864, May 10.—N° 1182.

DREYFOUS, SAMUEL.—“Improvements in air canes or pea-“shooters.”

The tube employed instead of being made straight and rigid is made of two parts, one part being elastic and the other rigid. An india-rubber or other elastic tube that may be bent is attached to the straight tube, which may be held level with the eye to enable aim to be taken while the elastic tube may be bent as required.

[Printed, 8d. Drawing.]

A.D. 1864, May 18.—N° 1250.

PARSONS, PERCEVAL MOSES.—(*Provisional protection only.*)
—“Improvements in ordnance and projectiles.”

Built up guns are proposed to be made “by coiling and welding “bars of wrought iron or suitable steel rolled with tongues and “grooves to fit into one another when the bar is coiled round a “mandril.” When the tube is made by coiling a single bar of iron or steel, a twisting motion may be given to the bar at the same time that it is coiled, so that its fibres are laid in “a spiral “direction.” Axial rotation may be given to projectiles by making spiral projections in the barrel from which they are fired instead of weakening the barrel by cutting spiral grooves in it.

Breech-loading guns are to be made with a conical screw plug which is screwed into the breech to close it, and when unscrewed is supported on hinges in a swinging frame. Projectiles intended to be fired from a gun rifled with spiral projections have corresponding grooves formed on or in their exterior surfaces.

[Printed, 4d. No Drawings.]

A.D. 1864, May 18.—N° 1255 (* *).

GRÆME, PATRICK ST. GORGE.—(*Provisional protection only*).—“Improvements in ships or vessels for war and other purposes.”

The inventor proposes to construct “iron clad borer boats,” “such being armed with a powerful rotating steel borer projecting from one or both sides of the same, such borer being by preference of an oval or spherical form, the surface of which would be covered with a series of sharp points or teeth or the borer may be of pyramidal or conical form, with sharp projecting edges running from the apex to the base.” “Should the borer bits be found liable to break when in the vessel, it is proposed to connect the same by means of a wire rope to the borer shaft so as to draw the broken pieces out on the retreat of the borer boat.”

[Printed, 4d. No Drawings.]

A.D. 1864, May 19.—N° 1269.

FRAZIER, JOHN.—“Improvements in breech-loading firearms.”

Barrels which are tilted at the breech, or “constructed on the break-down principle,” are, when shut down, fastened by means of a locking spring bolt, which takes into a recess in a projection attached to the under side of the barrels. The barrels are disengaged by moving a bent lever, which is fixed in front of the trigger guard; the lever withdraws the spring bolt and releases the barrels.

[Printed, 1s. Drawings.]

A.D. 1864, May 20.—N° 1278.

NEWTON, WILLIAM EDWARD.—(*A communication from Arthur Anthoni Voruz.*)—“Improvements in the construction of fuses for projectiles.”

The several pieces "which constitute a percussion fuse," that is "the abutment piece or anvil, the striker, the detonating cap, and a metallic protecting disc," are combined in one instrument, which is "independent of the projectile." The fuse so constructed is screwed into a socket or recess formed in the front of the projectile.

[Printed, 8d. Drawing.]

A.D. 1864, May 27.—N° 1312.

SIEVIER, ROBERT WILLIAM.—(*Provisional protection only.*)—"Improvements in cannons, mortars, or guns."

Guns or mortars are proposed to be made by rolling sheet metal into a tubular shape. Two tubes so made are to be riveted or otherwise fastened together, the tube of the smaller diameter being fixed concentrically inside the larger tube. The space between the tubes is to be filled with water, or molten metals may be run into the spaces between the tubes.

[Printed, 4d. No Drawings.]

A.D. 1864, May 31.—N° 1344.

HASELTINE, GEORGE.—(*A communication from James Ingersoll Day.*)—"Improvements in breech-loading fire-arms."

The breech of the gun is closed by a hinged breech cap. Upon the breech end of the barrel "is firmly fixed a ring or band," with an enlargement on one side, "which forms a portion of the hinge" of the breech cap. A tongue "formed on the ring extends rearward," and is "secured to the stock in any convenient manner." A recess is "formed in the breech cap," corresponding with the ring on the barrel. The rim "on the outer edge of the breech cap, when the latter is shut down, fits closely over the ring or band, with the under portion resting on the barrel." The breech cap is moved and opened by a projecting knob. Metallic cartridges are used, and after having been exploded are withdrawn a short distance from the breech end of the barrel by means of a wedge cam moved by the action of the breech cap. The breech cap is secured when in its place by means of a spring catch.

[Printed, 10d. Drawing.]

A.D. 1864, June 2.—N° 1372.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Theophilus Alexander Blakely.*)—"Improvements in ordnance and in gun carriages."

Protecting shields are used to protect men working a gun from the enemy's shot.

The shield may be attached to the gun itself, being made of a hollow conical form, and supported by a frame connected to rings or collars fixed on the gun. Or the shield may be attached to the gun carriage, the outer plates being inclined towards the rear of the gun. Or armour plates may be so fastened as to form a shield extending across the gun carriage in front of the wheels, and have an opening formed in it, through which the muzzle of the gun is projected.

[Printed, 10d. Drawing.]

A.D. 1864, June 4. —N° 1389.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improve-
ments in breech-loading fire-arms and in projectiles and cart-
ridges."

Breech-loading guns are proposed to be made with a sliding charge chamber, which "slides in an opening in the enlarged breech end of the barrel." In the extreme end of the breech a rod is screwed which carries a piston, which "enters and fits accurately" in the charge chamber. The sliding motion is effected by a lever and strap. In some cases the sliding chamber may be made to "rise and fall vertically in a frame or in bearings at the rear of the barrel."

An enlarged lump may be formed on the rear end of the barrel, on which a cap is screwed. When the cap is in the required position a slot, formed in it, is made to coincide with a hole in the lump and with the bore of the barrel. When the cap is turned the breech is closed by the solid part which forms a block. A sliding motion may be given to the barrels, so as to enable them to retire from the break-off and open the breech, or to press against the break-off and close the breech. Mechanically-fitting projectiles are made with projections on their front parts to fit into the rifling grooves; they may be made of hard metal coated with soft metal or alloy. Cartridges are made of paper with a disc of metal in the rear, in which is a hole to receive the percussion cap.

[Printed, 4d. No Drawings.]

A.D. 1864, June 4.—N° 1395.

MATTHEWS, WILLIAM JAMES.—(*Provisional protection only.*)
—“Improvements in breech-loading fire-arms.”

The breech may be forged “in one piece with the barrel, or be “screwed therein,” and a “slightly tapered circular opening” is to be made “transversely through the breech to receive a correspondingly tapered plug.” The plug closes the breech, and when required is withdrawn by a lever handle.

The foresight may be preserved from injury by affixing “a lug or pillar on each side thereof.” The trigger may be “centred to its guard in lieu of having a separate piece for that purpose.”

[Printed, 4d. No Drawings.]

A.D. 1864, June 4.—N° 1398.

SNIDER, JACOB, junior.—“Improvements in ordnance.”

Strengthening cylinders are introduced into guns previously used for firing spherical shot, so as to make them fit to fire elongated shot. A cylinder with a closed end is introduced into the gun from the muzzle, and is fitted to the seat of the chamber. A hole is bored through the cylinder and breech of the gun, and a bolt with a cup-shaped head is inserted, and by means of a nut is made to press the cylinder tightly against the breech of the gun. A composition or paint made of graphite is used to coat parts of the gun and make the joints gas tight.

An annular space may be left between the cylinder and the original bore of the gun at the part which surrounds the charge chamber.

[Printed. 6d. Drawing.]

A.D. 1864, June 7.—N° 1420.

NEWTON, WILLIAM EDWARD.—(*A communication from James Eads.*) — “Improvements in mounting and operating heavy “ordnance.”

Steam power is applied to give motion to heavy guns. The horizontal motion is given to the pivoted platform or gun frame by means of bevil wheels, which work vertical and horizontal rotating shafts connected with the pivot of the platform. Vertical motion is given by means of “pivotted levers” worked by pistons

in cylinders. The recoil of the gun "may be taken up by a "cushion of steam" acting in a suitably arranged cylinder.

In some cases the gun frame may be moved by hand.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, June 9.—N^o 1431.

PARSONS, PERCEVAL MOSES.—"Improvements in ordnance, "fire-arms, and projectiles."

The gun is made out of a solid piece of metal, or is built up by putting hoops on an interval tube; the gun or inner tube is first bored and turned to the requisite size, the metal on the outside is then brought into a state of tension in relation to that on the inside, by heating the gun or tube to a "bright red heat," and then cooling its interior with a stream of cold water. The metal on the exterior of the gun or tube will thereby be "caused "to be in a state of initial tension, and that on its interior to be "in a state of compression."

Tubes and hoops are made by coiling and welding steel or iron bars having tongues and grooves. Guns are rifled by employing raised ribs or projections instead of grooves. Breech loading large guns are made with a screw breech plug, which is mounted in a swinging or hinged frame.

In the case of small arms the breech is closed by a hinged breech block which is depressed to allow the cartridge to be inserted in the barrel. The breech block is at its rear end "mounted on a ball and socket joint" and is moved and supported at its front end by a bolt working vertically in an aperture working vertically through the trigger guard and the trigger plate. In large guns an annular valve is used to make a gas-tight joint. Projectiles are made with both front and rear parts of a conical shape. A backsight is made by causing a slide to move on a pillar or flap, on which a rack is formed; motion is given to the slide by a worm attached to the slide by a spring, so that it may be thrown into or out of gear.

[Printed, 1s. 6d. Drawings.]

A. D. 1864, June 9.—N^o 1437.

HAYDON, HIRAM WASHINGTON. — (*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A breech-loading gun is proposed to be made with a breech piece or charge chamber mounted on bearings or trunnions, so that it may be turned out of the line of the axis of the barrel to

receive the charge. A sliding motion is given to the breech piece to enable a "furrule" on its front to enter the rear part of the barrel. Motion is to be given to the charge chamber by a lever, which may serve as a trigger guard, and also moves "a vertical sliding wedge and curved forks" which operate on studs on the breech piece.

[Printed, 4d. No Drawings.]

A.D. 1864, June 14.—N° 1464.

ARMBRUSTER, CHARLES.—(*Provisional protection refused*).—"Breech-loading and other small fire-arms." The breech part of a revolver or other small arm is proposed to be "altered," so that by using "the bottom igniting cartridges" it may be possible to "add to the number of shots, economise the ammunition, diminish the weight of the fire-arms," and render them "safe against ordinary accidents."

[Printed, 4d. No Drawings.]

A.D. 1864, June 14.—N° 1465.

POPE, EDMOND.—"Breech-loading fire-arms." Barrels which are tilted and turn on a joint to receive the charge are fastened "by locking the barrels to the body and break-off by four combined bearings." A lump is attached to and underneath the barrels.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, June 15.—N° 1475.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Nicolas de Telescheff*).—"Field artillery."

Plates of "good steel," about half an inch thick, are attached to field guns which are made light, breech-loading guns are preferred. The armour plates may be so arranged as to form two parts, one of which is moveable "so as to be thrown back at will over the gun," the other part is "secured to the trunnions and axle." The upper armour may serve "as the lid of the caisson," while the lower part covers the sides of the gun.

[Printed, 4d. No Drawings.]

A.D. 1864, June 18.—N° 1517.

BOXER, EDWARD MOUNIER.—"Improvements in projectiles."

Shrapnel shell of an elongated form are made upon the principle employed by the patentee for his "diaphragm shrapnel shell" with further improvements. The improved shell is made in two parts, the head being attached to the body by "slight pins or

"wires," stronger pins being used to prevent the head from twisting. In the rear part of the body is formed a strong chamber for the bursting charge. A disc or diaphragm separates the powder chamber from the larger front chamber, which is filled with bullets or segments of metal. The bullets or metal segments are blown out, if required, without breaking up the shell case, or the shell case may be broken up at the same time, the fractures taking place along lines of least resistance formed so as to produce broken pieces of the required size. The front chamber is made of a form widening towards the front, so as to allow the bullets to be easily driven out. The bullets are fixed in position by running in the shell case resin, sulphur, or other suitable substance. The interior of the bullet or segment chamber may be lined with paper to prevent unnecessary adhesion. The head of the shell has an aperture in which the fuse is fixed, and the fuse ignites the bursting charge by means of a central column of powder or composition which passes through the bullet chamber.

Rockets "for throwing ropes" are made with two cavities, "the one behind the other, with a portion of solid composition between them," so as to give an additional and prolonged impulse to the flight of the rocket.

[Printed, 1s. Drawing.]

A.D. 1864, June 18.—N° 1521.

COUGHIN, THOMAS TOWNSEND.—(*Provisional protection only.*)

—"Improvements in projectiles applicable to ordnance and fire-arms."

Projectiles are proposed to be made with rings of soft metal or alloy attached to them. When the charge is fired the ring is driven forward into a suitable groove or channel, and by filling up the bore prevents windage.

[Printed, 4d. No Drawings.]

A.D. 1864, June 22.—N° 1554.

ALDRED, JOHN, and BAINBRIDGE, PETER.—(*Provisional protection only.*)—"Improvements in breech-loading guns."

Barrels that are tilted or turned down to receive the charge are to be fastened by means "of a locking bolt sliding in the body of the action." The bolt has a wedge-shaped end, which takes into a slot in a lug projecting from the under side of the barrels.

[Printed, 4d. No Drawings.]

A.D. 1864, June 22.—N° 1559.

SAVILLE, THOMAS PROSPER.—“An improvement or improvements in breech-loading fire-arms.”

Barrels of “drop-down” guns are locked by means of a “transverse sliding bolt or snap catch, which works in the body of the break-off and snaps into a notched lump on the under side of the hinged barrel or barrels and is instantly released by the pressure of the finger upon the head of the bolt.” The lump attached underneath the barrels is notched, and, when the barrels are shut down, an incline on the notched lump presses upon an incline upon the side of a notch made in the transverse horizontal sliding bolt, and presses it back like “the catch of a door lock,” and so fastens it. The head of the sliding bolt projects at the side of the gun in front of the trigger guard, and is moved by pressing upon it with the fingers.

[Printed, 8d. Drawing.]

A.D. 1864, July 1.—N° 1645.

WYLEY, ANDREW, and GRAINGER, JOHN.—“Improvements in fire-arms.”

A breech-loading barrel is made with an oblong lump formed at the rear end at right angles to the axis of the barrel. A deep groove is made in the lump into which “a flat valve is fitted,” which has “an angular motion on a strong pin or axis,” the centre of motion being below the barrel. A handle is attached to the flat valve, and by moving it sideways the breech end of the barrel is opened or closed. The cartridge is discharged by a cap, which is placed on a nipple fixed at the side, or in some cases centrally in the axis of the barrel. In some cases percussion tubes may be used for firing the cartridge. The back sight is made in an inverted V-shape. The lock and sights are in construction similar to those described in the Specification of prior Letters Patent, dated October 2, 1861, No. 2453. A spring blade sight, “attached to a dove-tail saddle-piece by a round loop, is used for a back sight for rifles required to shoot at moderate ranges.”

[Printed, 1s. Drawing.]

A.D. 1864, July 8.—N° 1694.

EHRHARDT, LOUIS HENRY GUSTAVUS.—(*Provisional protection only.*)—“An improved gunpowder.”

An explosive powder is proposed to be made by mixing powdered "tannic gallic acid or resin and chlorate or nitrate of potash" in equal parts. The mixture may be granulated and used for sporting powder.

[Printed, 4d. No Drawings.]

A.D. 1864, July 14.—N° 1760.

NEEDHAM, JOSEPH.—(*Provisional protection only.*)—"Improvements in breech-loading ordnance and other fire-arms, and in cartridges and projectiles to be used with the same."

The breech of the barrel is to be closed by a conical plug, which is to be fastened by a screw thread so cut upon it that the plug is released by a single turn or less. A safety catch lever is to be attached to the breech end of the barrel, which will prevent the hammer from falling when the lever is not in the required position. A cup or recess is made in the rear end of the bullet in which the "end of the cartridge" is inserted and fixed. In some cases the rear end of the bullet may be extended in the form of a hollow cylinder, in which the powder charge is inserted. Helical grooves may be made on the exterior of the projectile to give rotation.

[Printed, 4d. No Drawings.]

A.D. 1864, July 15.—N° 1772.

CROFT, JOHN McGRIGOR.—(*Provisional protection only.*)—"Improvements in shot, shells, rockets, or arrows."

Oblique grooves are proposed to be made in the surface of the projectile at the rear end to give it rotation. Spiral feathers may be employed to give rotation to rockets.

[Printed, 4d. No Drawings.]

A.D. 1864, July 15.—N° 1774.

DAVIES, GEORGE.—(*A communication from William Morgenstern and Barton Howard Jenks.*)—"Improvements in breech-loading fire-arms and in cartridges or charges for the same or for ordnance."

Metallic cartridges, having the detonating powder in a flange or rim, are employed. The cartridge is charged in a breech chamber, and the breech is closed by a compound sliding plug made in two parts and moved by a handle. The head of the cartridge enters a

recess made in the front portion of the sliding plug. The cartridge is discharged by the action of a curved hammer working under the breech end of the barrel, and within the stock.

Cartridges are made with the detonating composition placed in a tube projecting from the rear; the fire is communicated through an opening in the powder charge, so that the powder is ignited in more than one point.

[Printed, 10d. Drawing.]

A.D. 1864, July 15.—N° 1779.

WICKHAM, THOMAS.—(*Provisional protection only.*) — “An improved mode of calculating distances in rifle shooting, and apparatus connected therewith.”

A stationary cross bar is to be “fitted between flanges on the upper surface of the barrel [of the gun] near the breech.” Fixed lines or marks are made across the barrel at given distances, so that when the cross bar and a given fixed line are made to coincide the elevation for a given distance is obtained.

[Printed, 4d. No Drawings.]

A.D. 1864, July 16.—N° 1785.

WYLEY, ANDREW.—“Improvements in breech-loading fire-arms, including revolvers and ordnance.”

Breech-loading fire-arms are made with a breech case or chamber, which “is connected to the barrel by means of a screw having portions of the external and internal threads cut away, so that the one will slide longitudinally within the other and then interlock by a partial turn.” The system of construction is described as being applied to both single and double barrel guns, and to pistols and walking-stick guns, and to field guns. The breech case which is preferred to be used is constructed in the manner described in the Specification of former Letters Patent, dated October 2, 1861, N° 2453. An extractor having a “moveable jaw, which is made to bite” the end of the exploded cartridge, is used to draw it out by means of a lever handle. “Central locks with outside hammers” are employed.

[Printed, 1s. 4d. Drawing.]

A.D. 1864, July 19.—N° 1805.

LYME, JAMES.—“Improvements in fire-arms and in apparatus connected therewith.”

The stock is made of a tube, by preference of steel, which is bent into the required form and fitted with a butt plate to suit the shoulder. The butt plate is in some cases made moveable so as to assume any required angle. The fore sight is secured to the barrel, and the side nearest the eye is formed "at an angle of about 15° with a vertical line." The other side of the sight is also inclined. In a recess in the side next the eye is inserted a piece of white metal, with a dark vertical line. The ramrod is secured in a tubular piece of metal under the barrel, and is covered with a "double muzzle protector."

[Printed, 1s. Drawings.]

A.D. 1864, July 19.—N^o 1807.

HARDING, GUSTAVUS PALMER.—"Improvements in the manufacture of guns and ordnance."

The gun is composed of two or more thicknesses of metal "of like or different descriptions," care being taken that the interior metal be of a hard character, while the outer metal is "relatively soft." The interior tube is placed inside the exterior tube, and by the action of a mandril, having a swell upon it, is expanded so as to cause the two tubes to fit closely. The mandril is moved by hydraulic power.

[Printed, 1s. 4d. Drawing.]

A.D. 1864, July 20.—N^o 1811.

WILKS, WILLIAM HENRY.—"Improvements in fire-arms."

The rifle barrel is rifled with three shallow grooves into which the ball is expanded, and also with three deep grooves which "receive wings or projections on the ball." A chamber is formed in the breech end of the barrel, to receive the powder charge, "of larger diameter than the rest of the barrel."

[Printed, 8d. Drawing.]

A.D. 1864, July 20.—N^o 1813.

NEWTON, WILLIAM EDWARD.—(*A communication from Alfred Nobel.*)—"Improvements in the manufacture of and mode of applying explosive compounds."

Nitro-glycerine is used as a substitute for gunpowder for blasting purposes and for charges for explosive missiles. Nitric acid is added gradually to the glycerine, in doses so regulated that it

may "each time exhaust its action upon the glycerine, and the temperature at each operation does not exceed 40° F." The mixture of acids preferred to be used is obtained by dissolving "one part of nitrate of soda or potash" in 3½ parts of sulphuric acid. After cooling, a salt is deposited and separated by pressure or distillation, and "a mixture of nearly pure acids is obtained." If a speedy preparation of nitro-glycerine is required the whole of the glycerine is introduced into a mixture of two parts of sulphuric and one part of nitric acid, the mixture is well stirred, and poured directly into cold water. Instead of sulphuric acid the "monohydrate of phosphoric acid" is sometimes substituted.

[Printed, 4d. No Drawings.]

A.D. 1864, July 21.—N° 1816.

COOPER, JOSEPH ROCK.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A moveable charge chamber is proposed to be used for breech-loading guns. The chamber works in a prolonged part of the barrel, and is engaged in its place by the action of screws, parts of which are cut away so that a partial turn will lock them. Ordinary cartridges, fired with percussion caps, may be used.

[Printed, 4d. No Drawings.]

A.D. 1864, July 22.—N° 1832.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Francis Sorrel Claxton.*)—(*Provisional protection only.*)—"Improvements in the construction of cannon and other ordnance."

Guns are proposed to be made by "casting iron or bronze over" and around steel or wrought-iron rings set upon or suspended "about a core barrel." The cylinders so made are to be reinforced with steel or wrought-iron rings which are shrunk on. Guns which have been "broken transversely" may be repaired by casting metal upon them, and strengthening them with exterior bands.

[Printed, 4d. No Drawings.]

A.D. 1864, July 25.—N° 1844.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A muzzle-loading rifle, such as the Enfield rifle, is to be converted into a breech-loader by taking out the screw plug and

shortening "the breech end of the said barrel about a quarter of an inch." The breech of the barrel is to be closed by the action of a sliding bolt, connected with it by a breech case in which it works.

[Printed, 4d. No Drawings.]

A.D. 1864, July 26.—N° 1856.

BRITTEN, BASHLEY.—(*Provisional protection only.*)—"Improvements in projectiles for rifled ordnance and the method of manufacturing them."

Projectiles, suited for being fired from rifled guns, are proposed to be made of "cast iron, wrought iron, or steel," with projections formed or cast upon them. The projectiles are then coated with a thin coating of soft metal, cast on in moulds shaped like the rifled interior of the gun in which they are to be used. The rear part of the projectile is coated with a thicker coating of soft metal than the other part, so that it may be expanded into the rifle grooves. The soft metal coating is to be attached in the manner described in the Specification of former Letters Patent, dated August 1, 1855, N° 1740.

[Printed, 4d. No Drawings.]

A.D. 1864, July 27.—N° 1869.

ALEXANDER, ANDREW.—(*Provisional protection only.*)—"Improvements in firing or discharging and exploding missiles under water, and in constructing such missiles."

Continuously exerted motive power is proposed to be employed "to propel submarine" explosive projectiles or torpedoes. The power is to be supplied by the action of a coiled spring or the reaction of compressed air or gases generated by slowly burning compositions. The missile may be fired from a tube provided with "a water-tight ball and socket stuffing box." The missiles may be fired by means of electricity.

[Printed, 4d. No Drawings.]

A.D. 1864, July 29.—N° 1887.

COPE, JAMES.—"Improvements applicable to fire-arms and ordnance for ascertaining the distance therefrom of objects to be fired at."

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An indicating sight is used for the back sight of guns. A sliding bar is made to coincide with the line of sight taken at the top of the object aimed at, whose height, as that of a man, is known. The angle subtended being thus known the corresponding distance is marked on the side piece of the sight.

[Printed, 6d. Drawing.]

A.D. 1864, July 29.—N° 1888.

REDMAN, RICHARD, and KIRKWOOD, DAVID.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

Barrels that are tilted or turned down to receive the charge upon "the break-down and snap principle" are to be made with "two lumps forming two separate catches and snaps or one lump "and two snaps upon it." In some cases three lumps may be used.

[Printed, 1s. Drawings.]

A.D. 1864, July 30.—N° 1895.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

In the rear end of the barrel "a vertical slot or opening is to be made." In this opening a charge chamber is made to work by means of a lever motion, which raises or depresses it. The axis of the charge chamber "is preserved parallel to that of the barrel," when the chamber is raised, the charge is inserted, and it is then to be depressed and fired.

[Printed, 4d. No Drawings.]

A.D. 1864, August 6.—N° 1960.

LANCASTER, CHARLES WILLIAM.—"Improvements in projectiles."

Compound projectiles are made with the rear part formed of wrought iron, to which is welded a face of steel; or the body of the projectile may be made of cast iron with a face of steel screwed or otherwise fastened to it. The projectile may be subsequently hardened and tempered.

[Printed, 4d. No Drawings.]

A.D. 1864, August 8.—N° 1967.

COLLINS, WILLIAM, and POUNTNEY, WILLIAM.—"An improvement or improvements in breech-loading fire-arms."

Barrels which are tilted or "dropped down" upon a joint to receive the charge are fastened "by means of a cylindrical or taper bolt situated transversely in the body of the break-off." The bolt is "worked and pressed inwards by means of a horizontal lever, situated on the side of the gun or in a recess or depression in the side of the gun." The lever moves "in a horizontal plane," the end of one of its arms being jointed to the bolt, the other to a finger plate. A recess is formed in the lump attached to the barrels to receive the bolt, the inner end of which is bevelled, and is acted upon by the inclined side of the lump when the barrels are shut down; the bolt is thereby pushed back, and afterwards "snaps into the lump." Pin cartridges or percussion caps may be used.

[Printed, 8d. Drawing.]

A.D. 1864, August 10.—N° 1993.

MATHEW, BROWNLOW HUGH. — (*Provisional protection only.*)

—"Improvements in fire-arms and ordnance and in cartridges."

A breech-loading gun is proposed to be made with a moveable breech by applying "at the back end of the barrel or barrels, and parallel with the axis thereof," a tube "in which a leg projecting forward from the breech is made to work." A double thread may "be formed on the leg which works on a corresponding thread in the tube." Cartridges are to be made with a "flanged rim or enlarged part to carry a percussion cap."

[Printed, 4d. No Drawings.]

A.D. 1864, August 12.—N° 2011.

WILLIAMS, ALFRED HAMLYN. — (*Provisional protection only.*)

—"An improved holder for cartridges."

The cartridge holder is to be made of "a sheet or piece of card-board" or other suitable material, so that it may be hinged or folded together. A number of sockets, loops, or rings are attached to the folding piece, in each of which a cartridge may be inserted. When the holder is extended it is to form a stand, showing the cartridges which may have been expended by the spaces left.

[Printed, 4d. No Drawings.]

A.D. 1864, August 12.—N° 2013.

LINDSAY, JOHN PARKER. — (*Provisional protection only.*) —

"Improvements in locks for fire-arms."

Two hammers are proposed to be connected with and operated by one trigger, so that each hammer is discharged by a separate pull of the trigger. A detent is used, which is "operated by one of the hammers so as to arrest the trigger after it has discharged the first hammer," and prevent it from acting "on the sere of the second hammer." By again pulling the trigger the second hammer is discharged.

[Printed, 6d. Drawing.]

A.D. 1864, August 12.—N° 2014.

PECK, MILO.—(*Provisional protection only.*)—"An improvement in the manufacture of patched balls for fire-arms."

It is proposed to attach patches to projectiles by forming on the rear end of the projectile a rim or flange to which the patch is fastened. The projectile is then placed in a press or die, and the metal is compressed so as to form the projectile of the required shape and to press in and hold the edges of the patch.

[Printed, 6d. Drawing.]

A.D. 1864, August 13.—N° 2015.

HUXLEY, JOHN HOLDEN.—(*Provisional protection only.*)—"Improvements in projectiles."

Projectiles intended to be fired from smooth-bore guns are proposed to be made "with inclined planes on the side of a solid cylinder to produce rotary motion" by the action of the gases of explosion as they rush along them.

The cylindrical part of the projectile is to be made "in length as $1\frac{1}{2}$ diameters" and the "angle of the inclined plane 45 degrees as being most economical."

[Printed, 4d. No Drawings.]

A.D. 1864, August 13.—N° 2024.

COX, WILLIAM HINKES.—"Improvements in guns."

The amount of rotation required to be imparted to the projectile is given to it by mechanical means while it is inside the gun, and before the powder charge is fired. A shaft is made to enter through an aperture in the breech of the gun in a line with its axis. The front end of the shaft is connected with the projectile, behind

which is the powder charge through which the shaft passes. On the outer end of the shaft is a pulley to which motion is given by hand or steam power; the shafts are made to rotate and give rotation to the projectile, which is then fired from the gun.

[Printed, 8d. Drawing.]

A.D. 1864, August 18.—No 2048.

WILSON, THOMAS.—“Improvements in breech-loading fire-arms, and in converting breech-loading into muzzle-loading fire-arms.”

The tail pin of the ordinary muzzle-loading rifle is removed and the breech shortened about $\frac{3}{8}$ inch. A screw is then cut in the breech end of the barrel, and “a short tube or breech box” is attached to the barrel. The cartridge is inserted through an opening on the top of the breech box. “To the top and near the forward end of the breech box” is hinged a plate, and to the under side of the plate is attached a breech block, which “slides in dovetails formed in the plate.” A screw which works through the back end of the breech box tubes takes into the block, and when the piece is charged fastens the block in its place, being turned by a handle or thumb piece. Other modifications of the breech box are described. In some cases a striker or needle arrangement is made to work in the breech box and cartridges containing their own ignition are used. When the breech-loader is required to be used as a muzzle-loader a cup-shaped plug is inserted in and closes the breech end of the barrel.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, August 18.—No 2051.

YVOSE-LAURENT, LEWINSKI.—“An improved military outfit for soldiers in campaign, intended to protect the men, their provisions, and ammunitions against dampness and rain, and also for several other useful purposes.”

A piece of waterproof cloth is provided with buckles and straps so arranged that it can be folded in a small compass or used as a cloak or be spread as a carpet for a soldier to lie on. Several of the pieces may, if requisite, be joined together to form a large covering or carpet.

[Printed, 8d. Drawing.]

A.D. 1864, August 19.—N° 2059.

BURTON, BETHEL. — "Improvements in breech-loading and "revolving fire-arms, and cannon and metallic cartridges."

A breech chamber or case is attached to the rear end of the barrel in which works "a sliding pin," which is connected with "a sectional screw plug." The plug is drawn back to allow the cartridge to be inserted. Cartridges containing their own ignition are used. A safety pin is used to prevent the piece from being accidentally discharged.

[Printed, 1s. Drawings.]

A.D. 1864, August 20.—N° 2064.

DAVIES, GEORGE. — (*A communication from Donald McKay.*) — "Improvements in submarine shells or torpedoes, and in apparatus for operating the same."

The shell or torpedo is made of sheet-iron casing of the required form, which is preferred to be cylindrical with the lower end "cone-shaped." A tubular chamber or shell is formed in the casing, which is "charged with gunpowder or other explosive substance" so as to leave an air space in the shell, which space is separated "from the charge by a yielding wad or diaphragm." The use of the air space concentrates the explosion and directs "its force in the desired course." The charge is fired, when the torpedo has been submerged, by means of a weight which is fixed within the casing of the shell in such a manner that by pulling a wire the weight is released and falls upon a percussion cap or patch, which fires the charge. Self-acting machinery is employed for projecting the torpedo through an air-tight chamber formed in a ship's hold. The torpedo is attached to a sliding bar which is moved by suitable gearing connected with a steam-engine, and so arranged that it will cause the torpedo to be submerged at the required angle, and be released under the object upon which it is intended to act. The torpedo rises owing to its buoyancy, the sliding bar is drawn back into the ship, and the charge of the torpedo is fired by the tightening of the discharging wire. Vessels of "a strength greater than ordinary" are specially constructed to carry the torpedoes and submerge and discharge them.

[Printed 2s. Drawings.]

A.D. 1864, August 20.—N° 2067.

WALKER, JOHN. — "Improvements in ships of war and batteries, and in mounting, working, and covering guns to be used therein."

Ships' guns are mounted upon moveable platforms fixed on shafts working in cylinders by means of hydraulic pressure in such a way that they may be raised or depressed as required and be turned in any required direction, and be loaded and fired if necessary under the water line. Protecting covers are placed round the guns to cover the men who work them. Fixed or sliding and adjusting "truncated cylinders" are used for "elongating" the guns "for increasing their power." A ventilating shot and shell proof deck and deck covering are employed "for the more effective protection of the men while working the guns." Belts formed of armour plates with a backing of timber or other material, "with intermediate edge plates between them" which are "rivetted by flanges to the plates," are used to protect ships' sides, and for protecting covers on decks. The intermediate plates may be made of T-iron, "the head flanges of which are hollow or rivetted to the skin of the ship."

[Printed, 2s. Drawings.]

A.D. 1864, September 1.—N° 2144.

PETITO, ERNESTO. — "Improvements in breech-loading firearms."

The barrel of the gun is made in two parts "of which the forward part is fixed in the stock while the chamber or rear part to receive the charge is moveable by a lever, in such a manner that the chamber is raised to present its upper end for loading by the action of the lever that raises the hammer to full cock; for this purpose the chamber piece turns on a horizontal axis through a steel bushed hole in the rear of its breech end." "This axis is a screw, and when the lever turns the fore end of the chamber upwards through an angle of about 45°," the chamber is at the same time moved horizontally and is freed from the fore part. The surfaces in contact are made relatively convex and concave. Percussion action may be employed for effecting the discharge, or a needle bolt carrying a needle and actuating parts may be made to work in the chamber piece.

[Printed, 1s. Drawings.]

A.D. 1864, September 1.—N° 2145.

WILSON, THOMAS.—“Improvements in breech-loading fire-arms, and in converting muzzle-loading fire-arms into breech-loading fire-arms.”

A muzzle-loading rifle is converted into a breech-loader by chambering the rear of the barrel to the size of the cartridge intended to be used and cutting an opening through the top of the barrel. “A flap or plate carrying on its under side a nearly cylindrical block or closer, for closing the breech,” is jointed to the opening through which the cartridge is introduced. A ring or band is fixed on the barrel behind the back sight by a screw, or is shrunk on the barrel. A lump is formed on each side of the ring, and a pin is passed through holes formed in the lumps and acts as the pin of the hinge of the flap. In the case of new breech-loaders the lumps or ears are made part of the barrel. In some cases a tubular charge chamber is screwed to the end of the barrel; it has an opening which is covered by a hinged plate carrying a sliding plug which closes the breech. Self-igniting cartridges are used and are discharged by strikers made to slide in the steel block or closer. Various kinds of strikers are described. The exploded cartridge case is drawn out “by a hook or sliding bolt which works in a slot formed in the side or bottom of the rear of the barrel.” The breech-loader may be made suitable for being loaded at the muzzle by using a steel sliding plug to close the breech having a loose front part attached by a screw, so that it may be lengthened and plug up the breech of the barrel. In some cases a thin metal tube is inserted in the breech end of the barrel.

[Printed, 2s. Drawings.]

A.D. 1864, September 2.—N° 2153.

WILSON, JOHN HAYS.—(*A communication from Charles Dursien and William John Edwards Brown.*)—“Improvements in breech-loading cannon.”

The breech is closed by a sliding block, which is made to move in a transverse opening, by means of a rack and toothed wheel. A “semi-spherical chamber” is made “to receive the powder,” the use of which will enable “the whole of the powder” to be consumed.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, September 2.—N° 2159.

PARSONS, PERCEVAL MOSES.—“Improvements in ordnance
“and projectiles.”

Guns and mortars are “built up of or strengthened by steel or
“carbonized wrought-iron tubes or hoops,” which are hardened
or tempered “in oil, oleagenous fluids, or other fatty or greasy
“matters,” each tube or hoop being placed on the gun “in a
“state of initial tension.” Projectiles are made “at a cheap
“rate,” by casting them “of the requisite form from suitable cast
“iron, or cast iron mixed with wrought iron or steel, in sand loam
“or metal moulds, by any of the usual well-known methods.”
While hot, the projectiles are removed from the moulds, and
plunged “in a bath of oil, water, mercury, or other suitable
“liquid.” In some cases the projectiles may be cooled, and
made of the required shape, and then be re-heated and dipped in
the liquid bath. The kind of liquid used must be suited to the
qualities required to be given to the projectiles. Oil gives increased
toughness and strength to the metal when dipped at low tempera-
tures, and hardness at higher temperatures.

[Printed, 4d. No Drawings.]

A.D. 1864, September 9.—N° 2199.

WILSON, THOMAS.—“Improvements in breech-loading fire-
“arms and ordnance.”

The breech end of the barrel is closed by a steel block or closer,
which is hinged on one side, by preference the left side of the
barrel. One half of the barrel is cut away leaving a recess, which
is exactly filled by the block in which the nipple is fixed. A thin
tube is inserted in the rear end of the barrel to form a “gas
“check.” In some cases, a breech frame is attached to the
breech end of the barrel, and the breech is closed by a sliding
breech plug.

The breech end of breech-loading ordnance is closed by a breech
block, which is made to slide transversely in an opening or slot
cut in the barrel. Two holes are made in the breech block,
through one of which, the charge is inserted in the breech of the
gun, the breech block is then moved until the other hole is brought
opposite a screwed pin, which then engages in it and fixes the
block.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, September 12.—N^o 2226.

CLARK, GEORGE.—“Improvements in guns, gun carriages, and “projectiles, and in the manufacture and use of materials employed in their construction.”

The breech end of the gun is closed by a block, which turns on a hinge, and is fixed in its place by a screwed pin. The hinged block is moved by a projecting arm, whose weight nearly counterbalances that of the block, and enables it to be readily turned on the axis of the hinge so as to open the breech.

Large guns are made in two parts, the muzzle or fore part being carried by one carriage, and the breech or rear part being carried by another carriage. The two parts may be connected by a screwed hoop, or may be separated by unscrewing the hoop. In some cases, a removable breech chamber is used. Guns are built up by forcing rings that are comparatively thin upon a central tube. Projectiles are coated with a soft metal jacket, having projections that fit the rifling grooves, the body of the projectile being formed of hard metal. The front of the projectile is formed of a hollow pointed piece, which is of a form suited for passing through the air, and is crushed when the projectile hits a hard object. Compound projectiles are made by combining metals of different densities, so that “any required length” may be given to the projectile, “without too much increasing its weight.” A thin ring of soft metal is attached to the rear of the projectile, so as to fit the bore of the gun, and prevent the projectile from moving when charged ready to be fired.

Cannon may be made of an inner tube of wrought iron or steel, coated with “copper, brass, or gun metal” cast round it. For breech-loading small arms a tubular charge chamber is hinged to the rear end of the barrel, and is turned up to receive the charge. Cartridges are made by attaching the powder case to the bullet, by pinching the edge of the case in an annular indentation formed in the bullet.

[Printed, 1s. 8d. Drawing.]

A.D. 1864, September 12.—N^o 2227.

SANDERSON, CHARLES.—(*Provisional protection only.*)—“Improvements in the manufacture of ordnance.”

Guns are proposed to be made by “uniting masses of wrought iron, by soldering them together by means of molten steel

" instead of welding them." Two tubes are placed one within the other, and molten steel is poured into the annular space left between them. The compound barrel, so formed, is to be " forged in the usual manner." Bars of wrought iron arranged in a segmental form may be soldered by means of molten steel.

[Printed, 4d. No Drawings.]

A.D. 1864, September 20.—N° 2308.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Cosme Garcia Saez.*)—(*Provisional protection only.*)—" Improve-
ments in breech-loading fire-arms."

A breech-loading gun is proposed to be made by attaching a moveable charge chamber by a hinge to the end of the barrel. The charge chamber is to be turned up to receive the cartridge, and when in its place is secured during discharge by means of a locking pin.

[Printed, 4d. No Drawings.]

A.D. 1864, September 22.—N° 2322.

WALSH, JOHN HENRY.—(*Provisional protection only.*)—" Im-
provements in breech-loading rifles or fire-arms."

The breech end of the barrel of the piece is to be closed by a " hinged breech block hinged at one side " to a breech piece, screwed in the rear end of the barrel. Pin cartridges are to be used. If it is desired to use the piece as a muzzle loader, a hole is to be drilled in the breech block, and a nipple inserted, so that ordinary percussion caps may be used to fire the charge.

[Printed, 4d. No Drawings.]

A.D. 1864, September 22.—N° 2324.

DORVAULT, FRANÇOIS LAURENT MARIE.—" A new or im-
proved means of preventing the fouling of fire-arms."

Fatty or other greasy materials are enclosed in a capsule, made in the ordinary way of gelatinous or other suitable substance. The capsule, with the grease enclosed, is placed in the cartridge between the projectile and the powder, and when the charge is fired it lubricates the barrel, and prevents the fouling from adhering and accumulating.

[Printed, 4d. No Drawings.]

A.D. 1864, September 22.—N° 2330.

LISTER, GEORGE.—(*Provisional protection only.*)—"Improvements in fire-arms."

Instead of discharging a gun by means of a hammer or striker, it is proposed to use a "small plate, interposed between the touch hole and a small piece of copper," on which "the detonating powder or fusee is applied." The parts are so arranged as not to project, so that the risk of accidental discharge may be obviated.

[Printed, 4d. No Drawings.]

A.D. 1864, September 24.—N° 2349.

GREENER, WILLIAM. — "Improvements in breech-loading arms, and in cartridges to be employed therein."

The cartridge chamber of the gun, which is made for the Lefauchaux cartridge, is formed "only of such a length as to receive the powder and its wad, the shot being contained in the fore part of the cartridge case, of the same diameter as the bore of the gun." The cartridge is made "in detachable parts, that part containing the shot being smaller than that holding the powder." The cap which is fixed in the cartridge, and charged with detonating composition, is made of "such small circumference, that it will not allow of any lateral play of the exploding pin therein."

[Printed, 6d. Drawing.]

A.D. 1864, September 27.—N° 2361.

MACKAY, JAMES. — "Certain improvements in projectiles to be employed in ordnance and in the manufacture of the same."

The projectile is so shaped "that a certain length thereof, say for example one-third, shall be of less diameter than the remaining two-thirds." The exterior surfaces of both parts are parallel to the axis of the projectile. The junction between the parts "is formed by a bevel or inclined shoulder." The ends of the projectile are semicircular, and to keep the centre of gravity in a central position, a small portion of the front semicircle may be removed. When the projectile is made of wrought-iron or steel, it is heated and hammered or swaged, the hammer head and anvil being made of a shape corresponding to that of the projectile. The projectile is then reheated and pressed by hydraulic

pressure through a die box, "by this means the metal is densified
" in proportion to the pressure employed, and when the pressure
" has been sufficiently great, no further hardening is necessary for
" steel projectiles."

[Printed, 8d. Drawing.]

A.D. 1864, September 27.—N° 2371.

HARRISS, JAMES PLAISTER.—(*Provisional protection only*).
" Improvements in breech-loading fire-arms."

A charge chamber that turns upwards upon an axis is proposed to be used. It is fastened when in its place by a bolt, that is released by pressing in a stud. In some cases the charge chamber may "be moved to the left side on a slide" worked by a lever. A safety bolt is used to prevent accidental discharge, the safety bolt is released by pressing a button, and the piece is then discharged by pressing another button instead of pulling a trigger.

[Printed, 4d. No Drawings.]

A.D. 1864, September 28.—N° 2383.

JONGEN, JEAN.—"Improvements in the construction of fire-
" arms."

A revolver is made with a rotating breech-piece having charge chambers, whose rear ends are closed with screwed blocks, which are bored through and carry nipples. The hammer, instead of striking the caps directly, acts "upon a horizontal pin, called "a ram pin," which discharges the caps. The breech-piece is turned by a click operating upon ratchet teeth in the ordinary way.

[Printed, 8d. Drawing.]

A.D. 1864, September 30.—N° 2403.

HURRY, HENRY COLUMBUS, and WILSON, EDWARD.—
(*Provisional protection only*).—"Improvements in rifles and other
" small arms."

A breech-loader is proposed to be made with a sliding breech-plug, which works in a recess in the rear of the barrel, and is fastened in its place by a wedge piece. Back sights may be made with a vertical central wire instead of a cross bar.

[Printed, 4d. No Drawings.]

A.D. 1864, October 1.—N° 2423.

GISBORNE, FREDERIC NEWTON.—"Improvements in the means of working electric signals for gunnery practice."

The improvements are in part based upon those described in the Specification of prior Letters Patent, dated January 23, 1863, No. 210. "The armature of a shutter or pointer of steel is magnetised, and by using reversed currents," the operator can raise a shutter, or deflect a pointer by using the current which magnetizes the electro-magnet with contrary poles to the ends of the armature placed opposite to them. The shutter or pointer is held in position, after the galvanic current leaves the electro-magnets, by the permanent magnetism of the steel armature, while a reversed current, which changes the polarity of the electro-magnet, repels the shutters or pointer back to its normal position." A series of shutters or a polygon wheel, or a cylinder or disc, caused to revolve by a step-by-step motion by the action of the electric currents, may be used for the purpose of communicating signals and working batteries of guns on board ship or elsewhere.

[Printed, 8d. Drawing.]

A.D. 1864, October 6.—N° 2458.

TURNER, THOMAS, junior.—"Improvements in breech-loading fire-arms, and which said improvements are also applicable for the conversion of muzzle-loading fire-arms into breech-loaders."

A breech-loader is made with a breech case screwed on to the barrel, and "hollowed out centrally" to admit the cartridge. The breech is closed by a sliding plunger, having flanges which work in grooves in the breech case, and by which, when they have traversed beyond the grooves the plunger is fastened. The plunger is covered by a "smooth piece of hardened iron, steel, or other metal, held down in position by a screw, which plate forms a stop and a spring, and also covers the plunger and the recess in which it slides." "Tape or American priming" is used for discharging the piece.

[Printed, 10d. Drawing.]

A.D. 1864, October 7.—N° 2469.

MUIR, ANDREW.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A breech-loader is proposed to be made with a moveable charge chamber, which is fitted in a recess in the rear of the barrel "being caused to slightly recede, and then rise upon a "transverse pin," to allow the cartridge to be inserted. The moveable breech-chamber is mounted upon "an eccentric or cam "spindle," worked by a lever "disposed under the stock."

[Printed, 4d. No Drawings.]

A.D. 1864, October 7.—N° 2476.

PROWSE, ROBERT SAUNDERS, DUKE, HENRY, and CLAYTON, THOMAS.—(*Provisional protection only.*)—"Improvements "in 'ordnance' and small-arms."

Guns are proposed to be made by casting or forging, or building them up with "the internal spaces or chambers of an "oblong, say with the corners rounded off, or considerably "elongated, form in section," so as to be able to throw "bar "shot side foremost." Several touch-holes are used, so that the gunpowder may be ignited at various points and be all "exploded at the same instant."

[Printed, 4d. No Drawings.]

A.D. 1864, October 7.—N° 2478.

JACKSON, ADDIS.—(*Provisional protection only.*)—"Improvements in constructing and arming ships and other vessels, or "floating bodies."

A war ship is to be built with "three separate keels," and around the entire ship is "a casing of woodwork." Within the casing are placed perpendicular armour-plates, the spaces between them and the outer casing being filled with cork, or other filling substances. The ship may be propelled by several propellers.

[Printed, 4d. No Drawings.]

A.D. 1864, October 8.—N° 2480.

NEWTON, WILLIAM EDWARD.—(*A communication from James Finlay.*)—(*Provisional protection only.*)—"Improvements in the "construction of projectiles."

Projectiles intended to be fired from smooth bore guns, are to be made with cylindrical chambers formed in the rear of the projectile and placed "at an angle to the plane of the longitu-

"dinal axis of the projectile." The inclined chambers are filled with small charges of powder, which when fired, cause the projectile to rotate on its axis, so that it issues from the smooth bore piece with a rotation similar to that caused by rifling grooves.

[Printed, 4d. No Drawings.]

A.D. 1864, October 8.—N° 2482.

BOLTON, GERARD NOEL.—(*A communication from Jean Dauzat.*)—(*Provisional protection only.*)—"Improvements in "rifles and other fire-arms."

A breech-loader is proposed to be made with a barrel "arranged "to slide in the stock from and to a fixed breech plug." The barrel is moved by the action of a lever. The fixed plug "enters "the breech end of the barrel, and is formed partly elastic by "having a thickness of vulcanized india-rubber or other flexible "and elastic material between two metal plates," so that when the explosion takes place the elastic material is compressed and closes the breech.

[Printed, 4d. No Drawings.]

A.D. 1864, October 12.—N° 2513.

WILLIAMS, ISAAH.—(*A communication from Ambrogio Micheloni.*)—(*Provisional protection only.*)—"An improved revolver."

A sabre is proposed to be combined with a revolver pistol. The blade of the sabre will project beyond the pistol, its handle serves for that of the pistol, and the trigger is to be placed within the sabre guard.

[Printed, 4d. Drawing.]

A.D. 1864, October 17.—N° 2566.

NEWTON, WILLIAM EDWARD.—(*A communication from Thomas Hunter Walton.*)—(*Provisional protection only.*)—"Improvements "in safety fuzes for blasting."

A blasting fuze is proposed to be made by "ploughing a narrow "groove in a strip of wood," and laying a train of gunpowder or other composition in the groove. The groove is covered by coating the piece of wood with "waterproof material, such as oakum, "tarred cord, pitch," or other substances.

[Printed, 4d. No Drawings.]

A.D. 1864, October 18.—N° 2573.

THOMPSON, NATHAN.—(*Provisional protection only.*)—"Improvements in stoppers for bottles, jars, and other vessels, and in stoppers for the muzzles of fire-arms."

A stopper that may be used for the muzzles of fire-arms and for other purposes is proposed to be made by forcing a cork partly through a conical ring, so that the part forced through may expand. A metal stem with a conical head is then screwed into the part of the cork held by the ring, and a loop attached to it serves as a handle to enable the stopper to be withdrawn.

[Printed, 4d. No Drawings.]

A.D. 1864, October 19.—N° 2582.

RYER, WASHINGTON MICHAEL.—"Improvements in iron-clad vessels, and other apparatus for conveying and exploding submarine explosives."

Small iron-clad vessels capable of being propelled by steam power at high speeds are employed. Poles, working on rollers and moveable by machinery driven by the steam engine, are made to project from the vessel. Each pole is "armed with a torpedo," and reserve poles are employed as it is "presumed that each explosion breaks a pole." The charge to be exploded is contained in a suitable metallic vessel attached to the end of the pole, and is exploded either by percussion or the agency of electricity. Apparatus for discharging hot water upon an enemy is connected with the ship's boilers.

[Printed, 1s. 2d. Drawings.]

A.D. 1864, October 19.—N° 2585.

TURNER, THOMAS, junior.—"Improvements in breech-loading guns, and which improvements are applicable for single or double barrels."

The barrels are tilted or turned down to receive the charge. "The detent that holds the barrel or barrels in place" is actuated by means of "a plate lying on the sear or trigger plate, the wood of the stock being cut away for receiving it." The breech end of the plate is so made as "to grip the detent, which is held" by a spring inside the break off, "while the other end of the plate is connected with a small lever, working on a fulcrum" formed

" on the inside of the sear, behind the guard." The lever is worked by the finger so as to release the detent by its pressure.

[Printed, 10d. Drawing.]

A.D. 1864, October 19.—N° 2587.

HARRISS, JAMES PLAISTER.—(*Provisional protection only.*)—"Improvements in projectiles, and in sabots for projectiles."

Projectiles that may be fired from smooth bore guns are to be made with grooves or channels, so shaped that the course of the gases of explosion is made to diverge and take a transverse direction "at right angles to the vertical plane" of the axis of the projectile. By this means rotation is to be given to the projectile so as to produce the effect of rifling.

[Printed, 8d. Drawing.]

A.D. 1864, October 20.—N° 2590.

SNELL, WILLIAM.—(*A communication from Christopher Minor Spencer.*)—"Improvements in breech-loading fire-arms."

The breech is closed by a sliding block working up and down in a recess, and moved by a lever below the stock. In the stock is formed a tubular magazine, containing a store of cartridges which are pushed forward singly by a coiled spring. When the lever is depressed the sliding block is drawn from behind the breech end of the barrel, and a lever is set in motion which extracts the case of the cartridge which had been previously fired by means of a flange on its metallic base. As the sliding block is depressed the communication with the tubular cartridge magazine is opened, and a cartridge is pushed out. The lever being then moved upwards moves a receiving and guiding piece that pushes the cartridge forward until it is placed in the breech of the barrel, at the same time that it is closed by the sliding block. The piece is then ready to be again discharged. Cartridges made with a metallic base and flanged rim are used.

[Printed, 10d. Drawing.]

A.D. 1864, October 20.—N° 2594.

EHRHARDT, LOUIS HENRY GUSTAVUS.—"Improvements in the manufacture of gunpowder, and flasks to contain the same."

Gunpowder is made by mixing about 25 parts of tannic acid or tannin rosin with about 75 parts of chlorate or nitrate of potash, "all in a finely powdered state." The powders are kept separate until required to be used by carrying them in a flask divided by a partition into two chambers. Each chamber communicates with a common cover, which is so arranged that by turning the flask up the powders are mixed in the cover ready to be used.

[Printed, 4d. No Drawings.]

A.D. 1864, October 20.—N° 2599.

HALL, WALTER. — (*Provisional protection only.*)—"Improvements in barrels or casks for gunpowder."

Barrels used for containing gunpowder are to be lined "with india-rubber, or india-rubber cloth or felt," or other similar materials. Or two barrels may be used, one placed inside the other, with a layer of soft material between them.

[Printed, 4d. No Drawings.]

A.D. 1864, October 20.—N° 2602.

DAVIS, GEORGE. — "Improvements in fire-arms and cart-ridges."

A breech-loading gun is made with a plug breech constructed on the principle of the ordinary tap plug. The rubbing surfaces are coated with "platina or aluminium, or any suitable material" which will prevent the working parts from being deteriorated "by wear." A pointed striker, attached to the hammer, or working in a hole in the barrel, and retained by a suitable spring, is used for discharging the cartridge. A safety catch is attached to the spring of the lock to prevent premature discharge. Cartridges are made with the exploding charge enclosed in a wire casing that may be wrapped in, or lined with, paper; the casing is attached to a hard wad placed in front of it, so that when the charge is fired the casing and paper are driven forward out of the barrel.

[Printed, 8d. Drawing.]

A.D. 1864, October 21.—N° 2609.

WESTWOOD, SAMUEL, and BROADHURST, HENRY. — (*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A breech-loading gun is proposed to be made with a sliding plug to close the breech. The plug is worked by a lever, and moves in a chamber; when the plug is pushed into the breech the chamber is closed at the same time by a covering plate or lid.

[Printed, 4d. No Drawings.]

A.D. 1864, October 22.—N° 2622.

PITTS, WILLIAM.—(*Provisional protection only.*)—"Improve-ments in projectiles for artillery."

Projectiles are to be made with the backs or rear parts of soft metal, and cup shaped. In the cup-shaped back are "cuts transversely tangential to the axis, and longitudinally skew or inclined thereto, so that in the expansion the cut surfaces may close, or partly close, or lap against, or approach each other."

[Printed, 4d. No Drawings.]

A.D. 1864, October 22.—N° 2623.

RICHARDS, WESTLEY.—"Improvements in cannon and other cartridges, and in fire-arms."

A greased wad is inserted in the cartridge between the powder and the projectile. In some cases cup-shaped cases are made of felted fabrics saturated with grease, and are used as cases for enclosing the cartridge. Cartridges for small arms are made with a metallic capsule for the base. The fulminating composition is placed in an annular space round the base of the cartridge. A wooden plug is inserted in the cartridge upon a layer of paper pulp to form a strong base. For discharging the cartridge a sliding bolt is used, which in some cases is made to impinge directly upon the ignition composition contained in the cartridge. In some cases the striker is made to act by means of two pieces having inclined ends, so that if the hammer strikes one piece in a downward direction, motion can be given to the other piece in a horizontal direction, so as to cause it to impinge upon the cartridge and fire the charge. For extracting the exploded cartridge case a sliding nib having a hook is made to work in the breech end of the barrel.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, October 24.—N° 2628. (* *)

HOOKEHAM, RICHARD.—(*Provisional protection only.*)—"Improved powder magazines and receptacles for storing or keeping

“gunpowder or other explosive materials, and improved vessels and vehicles for transporting explosive materials from place to place.” The invention consists “in the construction of water-tight impermeable magazines or receptacles for gunpowder and other explosive materials which are to be supplied with water or non-inflammable media, and in these water-tight magazines or receptacles waterproof or impermeable powder casks or cases are to be placed, in which the gunpowder or explosive material would be contained. †

“In order the more perfectly to insure the powder or explosive materials against any chance of ignition and explosion, I would provide for the surrounding of the said casks or cases by the water or non-inflammable media, by supporting or suspending the same by means of framework or supports of suitable metal or material, so that each cask or case will be kept from contact from the top, bottom, and sides of the magazine or receptacle, and from each other. Such a receptacle being mounted on wheels would form a carriage or vehicle of conveyance, and with handles would be suitable for being placed in and removed from vehicles, or in and from vessels, as ships, barges, and the like. Or vessels might be constructed with such receptacles forming part of their structure.”

[Printed, 4d. No Drawings.]

A.D. 1864, October 28.—N° 2669.

HARRISS, JAMES PLAISTER.—(*Provisional protection only*).—
“Improvements in fire-arms and projectiles.”

“Discoidal, or elliptical, or spherical projectiles” are proposed to be fired from a gun barrel having longitudinal grooves formed in it. “For rotation in the vertical plane one groove runs along the top of the bore of the barrel, forming an upper boundary of the vertical plane, and the other along the bottom forming the lower boundary. For rotation in the horizontal plane the grooves are similarly placed, so as to form left hand and right hand boundaries of the horizontal plane.” The spherical projectiles have projecting rings “corresponding to the grooves.” The projectiles are to be fired with a sabot.

[Printed, 4d. No Drawings.]

A.D. 1864, October 28.—N° 2675. (* *)

PARKES, ALEXANDER. — “Improvements in manufacturing compounds of gun cotton and other vegetable substances

"similarly prepared, also in the preparation of castor and cotton oils and gum ballata to be used with or separate from such compounds."

In manufacturing compounds of gun cotton I employ a solvent, which I prepare by distilling wood naptha with chloride of calcium." "The solvent thus prepared I add to the gun cotton usually in such a proportion as to produce with it a pasty mass, which I use for waterproofing or coating fabrics, making sheets, tubes, and other articles, and for insulating telegraph wires." To prevent the above compound from becoming too hard it is kneaded with castor oil in a mixing machine; the proportions of the ingredients vary according to the degree of toughness desired.

Alcohol may be used in the place of wood naptha and chloride of zinc, or chloride of manganese may be substituted for chloride of calcium. To lessen the combustibility of the above compounds of gun cotton, either the method set forth in No. 2359 (A.D. 1855) may be used, or the compounds may be mixed with chloride of zinc or tungstate of soda.

According to this invention dissolved gun cotton may be combined with oil which has been treated with chloride of sulphur, this combination produces a very elastic composition. Gum ballata, heated with chloride of sulphur and compounded with dissolved gun cotton, may be used for the above-mentioned purposes.

[Printed, 4d. No Drawings.]

A.D. 1864, November 3.—N^o 2716.¶

DAVIES, WILLIAM, CATE, GEORGE, and CATE, WILLIAM. —"Improvements in machinery for cutting corks, bungs, gun wads, and other similar articles."

For cutting materials of a shape and size suitable for being used for gun wads, corks, and other purposes, self-acting machinery is used. A knife is attached to a sliding bar sliding in guides carried by a bed plate. The cork or other material to be cut is held between two discs, and self-acting motions are given to the cutter and the holders. The cutter or knife is kept sharp by means of two emery rollers which act upon its edges.

[Printed, 10d. Drawing.]

A.D. 1864, November 5.—N^o 2741.

SNIDER, JACOB, junior.—"Improvements in breech-loading fire-arms."

The improvements are based upon those described in the Specification of prior Letters Patent dated June 21, 1862, N^o 1828. The breech block which closes the breech works on a hinge, whose axis is parallel to that of the barrel, instead of being fastened with a spring catch, as described in the former Specification, an aperture is formed "through the breech pin," and a stud or pin is inserted in it, having a head "which abuts against a flange formed in the aperture aforesaid; when projecting through the aperture it is free to act on the recoil bearing surface of the breech piece as hereafter described. A spring, retained in its place by a headless screw, presses the stud or pin forward. In the rear vertical face of the breech piece" a small hole is bored, opposite the stud or pin, "so that when the breech piece is shut down in place this latching stud enters the hole in the vertical rear face of the breech piece, and so retains it in its place."

A similar principle of fastening may be applied to guns with turn down barrels on the "Lefauchaux system."

[Printed, 6d. Drawing.]

A.D. 1864, November 7.—N^o 2759.

NEWTON, WILLIAM EDWARD, and SHEPARD, EDWARD CLARENCE.—"Improvements in breech-loading fire-arms, and in the cartridges to be used therewith."

The breech is closed by a breech piece, which is "either mounted on a strong pin, on which it may be turned back to open the breech of the barrel," or it may be "made to slide in a line parallel, or nearly so, to the longitudinal axis of the barrel; but in whatever way the breech piece be moved, to open the breech of the barrel for charging the gun a block or strut is placed behind this breech piece to receive the recoil." The block or strut may be "connected by a joint with the moveable breech piece, or be formed in one piece" with it, or be jointed "to some other part of the arm," in such a way that it is placed securely behind the breech piece. A hook or "cartridge extractor" is attached to the moveable breech piece, and cartridges containing their own ignition are used by preference. The cartridges are made of compressed gunpowder, the grains of which may be "damped with nitro-glycerine." The cartridge may be covered with a fabric treated like gun cotton, with nitro-sulphuric acids, and coated with collodion.

[Printed, 1s. 6d. Drawings.]

A.D. 1864, November 7.—N° 2763.

HARDING, GUSTAVUS PALMER, and THOMAS, LYNALL.—
“Improvements in guns and fire-arms.”

In constructing the gun “there is formed behind the charge a space or chamber with an opening into the atmosphere.” At the front of the chamber behind the powder charge is placed a cup-shaped wad, and at the other end of the chamber is another wad which closes it, being supported by a shoulder formed on the breech plug. “At the discharge the projectile is driven forward, whilst the wad at the back end of the charge is driven back, compressing the air, and ultimately it and the other wad are driven out, there being a stop or guard to receive the wads.”

[Printed, 6*d.* Drawing.]

A.D. 1864, November 8.—N° 2777.

RYDBECK, SVEN.—“Improvements in breech-loading fire-arms and cartridges.”

The breech is closed by a block hinged at its fore part to the barrel. The block is released by a lever acting on the top of the breech, and is then turned back to allow the cartridge to be inserted in the barrel. The cartridge contains its own ignition. Behind a charge of loose powder is placed “a disc or stopper of gunpowder moulded in a suitable mould;” in the centre of it is a recess, in which is placed a percussion cap, and behind which is a perforated wad of greased felt. The cap is discharged by a needle working in a slide in the breech block; it is propelled by a blow from the hammer which strikes a projecting piece connected with the needle slide. The slide is drawn back by the action of a coiled spring. Cartridges may be made without the plug or disc of compressed or moulded gunpowder, the flange of the percussion cap being in that case held between two perforated discs of leather.

[Printed, 10*d.* Drawing.]

A.D. 1864, November 9.—N° 2784.

THOMPSON, JAMES.—“Certain improvements in the manufacture of gun barrels and ordnance.”

The improvements are in part based upon those described in the Specifications of prior Letters Patent, dated respectively

April 24, 1863, No. 1024, and January 19, 1864, No. 139. "Homogeneous metal, known as Bessemer's steel," is employed for gun barrels and ordnance. The metal is heated and hammered or swaged to solidify it, and is then cut or sawn up into pieces of the required size. For gun barrels the pieces are pierced or punched "by displacing the metal concentrically through the "mass." The perforated piece is then, by rolling or swaging it, formed into a gun mould and elongated to form a barrel.

[Printed, 4d. No Drawings.]

A.D. 1864, November 11.—No 2799. (* *)

HENTY, GEORGE ALFRED.—(*Provisional protection only.*)—"Improvements in the building or manufacture of torpedo rams." "The torpedo ram to be an ordinary iron-clad ship, of any form or size, propelled by steam or other power, and furnished with the apparatus further specified, which can be applied either to existing ships or to vessels built specially for the purpose." In the bow of the vessel and parallel with her keel are placed two chambers, one on each side of the stem. These chambers are placed below the water line, the top of the chamber being from four to ten feet below the surface, and the bottom of the chamber to extend as far down as possible to the bed of the ship. The chambers to be closed in front by sliding valves as nearly as possible flush with the external skin of the vessel.

Each chamber to open internally in the vessel by doors or valves capable of closing, so as to prevent the ingress of water to the ship herself when the external valves are open, and the chambers consequently full of water. The chambers to be constructed of iron. Each chamber to contain a torpedo of sufficient size to hold the requisite quantity of powder, and a sufficient quantity of air to make it about the same weight as an equal body of water. "Each chamber to be furnished with a series of long rods of iron or steel, of sufficient strength, passing through it into the ship and lying parallel to the keel thereof, and supported by rollers at intervals. These rods to be placed beneath each other, so as to enable the torpedo to be run out at any desired depth in proportion to the depth at which it may be desired to strike an enemy. The torpedo being attached to one or more of these rods and the inner doors being closed, the outer valves of one of the chambers are opened and the torpedo run out on the rods,

“ when approaching an enemy, to a sufficient distance, so that
 “ when it explodes it may, while destroying the enemy, do no
 “ damage to the torpedo ram herself.” “ The explosion having
 “ taken place, the rod or rods, or such part of them as remain, to
 “ be withdrawn into the ship, the external valves closed, the
 “ water pumped from the chamber, the interior doors opened, and
 “ a fresh torpedo lowered into the chamber and attached to the
 “ same or other rods, and in this way the torpedo ram may be
 “ enabled, with her alternate chambers, to strike and sink any
 “ number of ships in succession.”

[Printed, 4d. No Drawings.]

A.D. 1864, November 11.—N^o 2816.

SUTHERLAND, HORATIO, and SUTHERLAND, EDWARD
 (executors of Douglas Symonds Sutherland).—“ Improvements in
 “ machinery for compressing gunpowder for blasting or other
 “ purposes, and in cartridges for blasting.”

A series of pistons or rams are mounted in a frame, and are
 made to work in a series of cylinders in which the powder is
 placed. The rams when forced into the cylinders compress the
 powder charges. The cylinders are closed by slides, which are
 moved away to allow the compressed charges to be pushed out.

A blasting cartridge is made by enclosing a compressed powder
 charge in a paper case and placing on the top of it a conical piece
 of wood or two wedge-shaped pieces. The blasting hole is then
 filled with sand in the usual way, and the shape of the filling
 pieces causes the sand or earth to offer increased resistance when
 the blasting charge is fired.

[Printed, 8d. Drawing.]

A.D. 1864, November 12.—N^o 2818.

DAVIES, GEORGE.—(*A communication from De Witt Clinton
 Baxter, Benjamin Jones Burr, junior, and Jonathan Mather Schol-
 field.*)—(*Provisional protection only.*)—“ An improved knapsack
 “ supporter.”

The knapsack is proposed to be made with two metal strips
 attached to it, which reach from the shoulders to the hips of the
 person carrying the knapsack. Over the shoulders are two curved
 metal pieces connected in front by a strap. Straps also pass
 round the lower part of the knapsack and are secured in front.

[Printed, 4d. No Drawings.]

A.D. 1864, November 14.—N° 2831.

BELL, GEORGE, and LÜTHY, ROBERT.—“ A process for obtaining dense and flawless castings of metals and solid blocks of other substances, particularly desirable in the production of ingots for forgings, heavy pieces of ordnance, and hydraulic press cylinders.”

An air-tight communication or channel is formed to connect the vessel containing the metal used for the casting and the mould in which it is cast. The mould is also made air tight. The air contained in the channel and the mould is then exhausted by means of suitable exhausting apparatus, and the metal is run through the channel and into the mould in vacuo. A sound casting, free from air holes and flaws, is thus produced.

[Printed, 10d. Drawing.]

A.D. 1864, November 15.—N° 2853.

NOLAN, JOHN PHILIP.—“ Improvements in the manufacture of projectiles by cooling them either wholly or partly from the interior.”

The projectile is cast in a mould, into which is introduced a pipe, so placed that when the hot metal is cast round it, water or other fluid at a lower temperature than the cast metal may be made to pass through the pipe. The cast metal is thereby cooled from the interior.

[Printed, 10d. Drawings.]

A.D. 1864, November 15.—N° 2855.

RESTELL, THOMAS.—“ Improvements in breech-loading fire-arms.”

The improvements are based upon those described in the Specifications of prior Letters Patent, N° 2630 of 1857, and N° 1497 of 1858. The breech is closed by a sliding breech piece which is secured by “ a transverse bolt.” In order to facilitate the removal of the breech for the purpose of cleaning the gun, “ two longitudinal grooves or recesses ” are formed in the transverse bolt, into which two shoulders formed by notching the hammer boss respectively, but alternately take, and by this means the movements of the hammer are brought under control.”

In converting muzzle-loaders into breech-loaders instead of reducing “ the thickness of the tumbler, bridle piece, and rear,” the

tumbler and sear are recessed "at their centres, to receive the ends of the bridle-piece by which the fulcrum pins of these moving parts are securely held."

The percussion breech-loader may be converted into a needle gun by fitting a needle and actuating apparatus in the sliding breech piece.

[Printed, 1s. 10d. Drawings.]

A.D. 1864, November 18.—N° 2882.

BLAKELY, THEOPHILUS ALEXANDER.—"An improvement in working guns."

In order to facilitate the working of guns which are "pivotted in or near the centre of the port hole or embrasure," a counter-balance weight is attached to the rear of the gun. The weight is attached to a cord which passes over a pulley attached to the frame of the gun carriage.

[Printed, 10d. Drawing.]

A.D. 1864, November 19.—N° 2892.

TONGUE, JOHN GARRETT.—(*A communication from Florencio Redondo.*)—(*Provisional protection only.*)—"Improvements in fire-arms and in cartridges for the same, also in the mode of mounting bayonets thereon."

A breech-loading needle gun is proposed to be made with a breech piece or charge chamber mounted in the rear of the barrel and moved sideways by a projecting lever piece. The needle or striker is contained in the breech piece.

The bayonet is to be fastened by a spring which presses against the barrel allowing the bayonet to "rise and descend at pleasure." The cartridges used are made of paper with a metallic base or cap.

[Printed, 8d. Drawing.]

A.D. 1864, November 22.—N° 2907.

LEETCH, JAMES.—(*Provisional protection only.*)—"Improvement of breech-loading fire-arms and cartridges to be used therewith."

A breech-loading gun is proposed to be made with a charge chamber closed by a breech piece sliding in an elongated slot at right angles to the axis of the barrel.

A ring of india-rubber or other flexible material is to be attached to the base of breech-loading cartridges to prevent the escape of the gases of explosion.

[Printed, 6d. Drawing.]

A.D. 1864, November 22.—N° 2912.

SNIDER, JACOB, junior.—“Improvements in breech-loading “fire-arms.”

The improvements are based upon those described in the Specifications of prior Letters Patent, dated June 21, 1862, N° 1828, and November 5, 1864, N° 2741. The breech of the barrel is closed by a breech block that turns on a hinge whose axis is parallel to that of the bore. The spent cartridge case is pushed out by “the draw cartridge” or extractor, which is a projecting finger sliding upon a pin or bar fixed at the side of the rear end of the barrel and parallel to its axis. The “draw cartridge is operated “by attaching the breech piece to the draw cartridge by means of “a screw working in a slot, groove, or opening,” or by “other “suitable means.” Central-fire cartridges are used and the striker is placed in a slanting direction in the breech block so that a blow from the hammer on the head of the striker causes it to strike and ignite the cartridge.

[Printed, 10d. Drawing.]

A.D. 1864, November 25.—N° 2947.

SIEVIER, ROBERT WILLIAM.—(*Provisional protection only.*)—“Improvements in cannons, mortars or guns.”

Guns are proposed to be made from “sheet or plate metal either “welded, rivetted, screwed, or soldered into tubes.” The tubes are made of different sizes, so that one may be placed inside the other, and the annular space between them is to be filled with water or other liquid, and the ends closed up.

[Printed, 4d. No Drawings.]

A.D. 1864, November 25.—N° 2951.

REEVES, CHARLES.—“Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms, a part of “which improvements may also be applied to ordnance.”

A cartridge containing its own ignition is discharged by means of an anvil fixed in the cartridge at right angles to its axis, but not projecting from the side of the cartridge. To the side of the

" Upon the progress of the shell, to which the fuse is fitted, the air is forced through the minute aperture, ignites the priming or quick match, and through it the fuze."

[Printed, 4d. No Drawings.]

A.D. 1864, December 3.—N° 3017.

ULRICH, JOHN GOTTLIEB.—(*Provisional protection only*).—" Improvements in the means and contrivances employed in the packing, conveying, and storing of gunpowder and other explosive materials, to prevent the accidental explosion thereof."

Barrels used for containing gunpowder are to be made with heads and bottoms, " having a square, or nearly square set off on each side," corresponding grooves being formed in the staves. Access to the barrel is given by means of a hole, which is closed by a bung or stopper. Gangways used during the storage of gunpowder are to be provided with ledges or grooves, in which any grains of gunpowder may be caught and isolated, so that trains are not formed. Magazines and store houses for gunpowder are to be made with doors and windows hermetically closed.

[Printed, 4d. No Drawings.]

A.D. 1864, December 5.—N° 3026.

CLARK, WILLIAM.—(*A communication from Hiram Berdan*).—" Improvements in fire-arms, cartridges, and cannon, and in an improved method of fixing the bayonets of fire-arms."

The barrels of breech-loading guns are rifled up to the breech end of the barrel, including the " counter bore or chamber." Cartridges having cases shaped externally to fit the rifled interior of the barrel are employed. Cartridges are made to contain two or more bullets.

A breech-loading gun is made with its breech closed by a hinged breech block or " swinging latch," that closes against the rear face of a ring, which is supported on " a longitudinal slide," working in a groove.

The cartridge is passed through the ring, and when it is fired the spent cartridge case is extracted by moving back the " ring extractor."

The bayonet of a musket is fastened in such a position that " the blade of the bayonet stands in the same plane as the ramrod of the gun."

Sights for guns are made with a sight line, and a "peak hole" made in the slide.

[Printed, 1s. 6d. Drawing.]

A.D. 1864, December 5.—N° 3029.

NEWTON, WILLIAM EDWARD.—(*A communication from James Buchanan Esq.*)—"An improved method of operating guns in "fortifications and floating batteries, and in the construction of "rotating towers for the same."

Heavy guns are mounted on carriages or frames, which are worked by self-acting gear, which raises, or lowers, or trains the gun in such a way as to "admit the use of a porthole, just large "enough to receive the muzzle of the gun." The turret or tower in which the gun is mounted is turned by working gear, which is independent of that which works and turns the gun. Several portholes are made in the turret, any one of which can be opened or closed, so that the gun can be turned and fired through any porthole, or the turret can be turned without the gun being moved.

[Printed, 1s. 4d. Drawings.]

A.D. 1864, December 8.—N° 3058.

NORTON, JOHN.—"Improvements in the construction of bow s "used by archers."

The bow is made of "two or more pieces of wood, horn, whale-bone, or steel," or other suitable materials. The component pieces are, when placed in their proper positions, bound together by layers of india-rubber or other elastic tapes, "the tension of "which binds the component parts together."

[Printed, 4d. No Drawings.]

A.D. 1864, December 12.—N° 3077.

MONCRIEFF, ALEXANDER.—(*Provisional protection only.*)—"Improvements in mounting ordnance, and in the machinery, "apparatus, or means connected therewith."

The gun carriage is proposed to be mounted on "two curved "elevators, to which are connected suitable counterweights, with "apparatus to apply friction, and a purchase for raising and "lowering the gun, together with a reflecting sight, and a scale "on the traversing rail." When the gun recoils, it first moves parallel to its longitudinal axis, and then "lowers itself into a "position convenient for loading out of fire. The counterweights

F. A.

C. C.

" which are raised as the gun sinks are sustained by a catch.
 " When the counterweights are depressed the gun is raised into
 " position for being fired."

[Printed, 4d. No Drawings.]

A.D. 1864, December 14.—N° 3091.

BARNESLEY, JOSEPH.—(*Letters Patent void for want of Final Specification.*)—" Improvements in the manufacture of solid and
 " seamless metal tubes, gun barrels, and artillery, and for
 " machinery to be used in the same."

Gun barrels are proposed to be made by rolling them. A hollow bloom of iron is passed successively through two or more pairs of suitably grooved rollers. An egg shaped mandril attached to a bar, which is supported upon suitable adjustable stands, is used to give shape to the interior of the barrel.

[Printed, 4d. No Drawings.]

A.D. 1864, December 14.—N° 3103.

COLES, COWPER PHIPPS.—" Improvements in apparatus for
 " working and loading ordnance."

The improvements consist "in the employment for running
 " guns in and out of a winch with a chain, that may be placed in
 " front or in the rear of the gun or in any other convenient position; the chain is attached to an eye-bolt in and under the gun-
 " carriage, passes over one or more pulleys or gins round the
 " barrel of the winch, and the ends are secured by a tightening
 " screw." In some cases the chains may be attached directly to the eye-bolt. The winch has a barrel for the chain, and a drum
 " to receive a break strap." The barrel and drum revolve freely when "a lever throws a cog-wheel and clutch out of gear."

For slinging and moving heavy projectiles up to the muzzle of a gun, a cradle is used provided with suitable handles, so arranged and held by claws that the shot cannot turn over until it is ready to enter the bore of the gun, when "the claws are released," and the projectile is pushed and rammed down into the barrel.

[Printed, 10d. Drawing.]

A.D. 1864, December 15.—N° 3111.

FONTAINEMOREAU, PETER ARMAND LE COMTE DE.—(*A communication from Maurice Mondon.*)—" Certain improvements in the manufacture of gun barrels."

"Damasked iron and steel gun-barrels" are made by placing suitably arranged pieces or bars of iron and steel in a bundle or pile, and heating them in a reverberatory furnace. A suitable bloom is bored in a cold or heated state. The bloom is then rolled, and it is extended by means of mandrils forced in and then opened by means of wedges. In some cases the barrel may be made "of malleable molten steel or molten iron," run into a mould.

[Printed, 4d. No Drawings.]

A.D. 1864, December 17.—N^o 3132.

RENTON, AMHERST HAWKER.—"*Provisional protection only.*)
—"Improvements in fire-arms."

A curved hammer is proposed to be used and so constructed "that it may be made to strike on the end of the cartridge at a point excentric to the line of sight, so as to offer no impediment to the aim of the gun. The thumb-piece of the hammer is also curved to admit of the free insertion of the cartridge into the breech of the barrel."

[Printed 4d. No Drawings.]

A.D. 1864, December 19.—N^o 3144.

SWINARSKI, ERNEST.—"*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The breech end of the barrel is to be made of a conical shape and a sliding plug or breech-piece carrying a needle is to be made to slide in a box behind the breech. The front of the breech-piece "is made of the shape of a female cone," and when it is pushed upon the end of the barrel it is turned by a handle, so that projections formed upon it are locked in corresponding projections formed on the barrel.

[Printed, 4d. No Drawings.]

A.D. 1864, December 19.—N^o 3149.

BLACKWOOD, Sir FRANCIS.—"*Provisional protection only.*)—

"A new or improved apparatus for elevating or lifting shot or shell to the fighting deck of vessels or in batteries of war."

An endless chain is to be made to work round axes fixed respectively upon the level of the upper and lower decks of a vessel. Arms or buckets are to be attached to the endless chain

which are made to work like the "buckets of a dredging machine," or the receivers of an elevator. Projectiles may be placed upon the arms or buckets, and moved from one level to another as required.

[Printed, 4d. No Drawings.]

A.D. 1864, December 20.—N^o 3159.

GRIMSTON, THOMAS AUGUSTIN.—"An improved apparatus to be used with breech-loading fire-arms, so as to render them available for use as breech-loaders or muzzle-loaders as may be found convenient."

A metallic case "is placed in the rear end of the barrel so as to form a case or chamber to receive the charge," being of the form of an ordinary cartridge case. A perforated pin is then introduced into the pin-hole used for the pin of the breech-loading cartridge, and serves as an ordinary nipple. The perforated pin is screwed into the metallic case. The gun may then be used like an ordinary muzzle-loader.

[Printed, 8d. Drawing.]

A.D. 1864, December 21.—N^o 3165.

WOODWARD, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The breech of the gun is to be closed by means of a hinged block, which is hinged at its fore part, and is turned up by a handle to allow the cartridge to be inserted. The block fits into a chamber in the rear of the barrel, and has a slot or groove in its base "to allow the free action to and fro of an extractor for the purpose of removing the cartridge case." It has a slot in the back in which works a bolt that fastens the block and holds it during discharge.

[Printed, 1s. Drawings.]

A.D. 1864, December 23.—N^o 3196.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Charles Rochaz.*)—(*Provisional protection only.*)—"Improvements in portable fire-arms and in cartridges."

A breech-loading cartridge is proposed to be made "with the edges of the rear end flanged out." A base of felt or other elastic material is used for closing the rear of the cartridge. An

aperture is made in the felt base closed by two thin discs preferably of paper. To the disc nearer to the powder is attached the fulminating composition, and ignition is caused by propelling a needle through both discs. The needle is carried by a hammer or block which is firmly pressed against the felt base, and the outer disc, and so prevents escape of the gases of explosion.

[Printed, 8d. Drawing.]

A.D. 1864, December 29.—N° 3231.

SUTHERLAND, HORATIO, and SUTHERLAND, EDWARD, executors of Douglas Sutherland.—“Improvements in preparing charges for and in charging ordnance.”

The charge is made by preference of compressed gunpowder or gun cotton. It is enclosed in a case of soft substance, such as wood, which acts as a lining to the powder chamber of the barrel in which the charge is fired, and protects it from being injured by the gases of explosion. Behind the case a small charge of powder or explosive substance is placed in such a position that it is fired subsequently to the main charge, and blows the case out of the barrel. The charge and case may be made up in a cartridge with the projectile.

[Printed, 6d. Drawing.]

A.D. 1864, December 29.—N° 3240.

CAIL, RICHARD.—(*Provisional protection only*).—“Improvements in projectiles.”

The projectile is to be made “with spiral sinkings or grooves on the sides and rear to be acted upon by the gas in the gun in order to impart rotary motion thereto.” A loose end piece or sabot may be used with the projectiles.

[Printed, 4d. No Drawings.]

1865.

A.D. 1865, January 4.—N° 27.

THOMPSON, NATHAN.—“Improvements in stoppers for bottles, jars, vessels, and tubes, also for ordnance and fire-arms.”

A stopper that may be used for closing the muzzles of guns and for other purposes is made by fixing between two discs or washers

a ring of elastic material, such as vulcanized india-rubber. The two discs are pressed towards each other by the action of a jointed lever fixed on the top of the stopper. The lever is attached to a stem which draws the discs together and at the same time expands the ring and so closes the orifice in which the stopper is placed.

[Printed, 10*d.* Drawing.]

A.D. 1865, January 6.—N° 54.

AMES, HORATIO.—“An improved method of constructing ordnance or cannon of wrought iron.”

The gun is made by welding together annular pieces or rings by the aid of powerful steam hammers. The rings are arranged “concentrically in annular sections,” which are welded “endwise together.” A bar or porter piece is attached to the breech, during the manufacture it forms part of the gun, and is used for the purpose of holding it and moving it as required for the successive welding operations. The rings are, before they are welded, turned so that the surfaces to be welded may be made exactly to correspond.

[Printed, 6*d.* Drawing.]

A.D. 1865, January 10.—N° 78.

MEYER, ADOLPH, and MEYER, MORITZ.—(*A communication from Wilhelm Gerhardt.*)—“Improvement in breech-loading fire-arms.”

The charge chamber is contained in a breech piece which is hinged at its rear part to the stock of the gun. The charge chamber is turned up to allow the cartridge to be inserted from the front. The two parts are connected, when the breech piece is in its place, by means of a screwed collar turned by a “thumb-lever.” At the same time that the breech piece is raised, a needle is set ready to be propelled through an orifice in the rear of the charge chamber and so to ignite the cartridge.

[Printed, 8*d.* Drawing.]

A.D. 1865, January 12.—N° 106.

DAW, GEORGE HENRY.—“Improvements in breech-loading fire-arms.”

The breech plug turns on an axis “so that it is capable of being moved back to admit of a cartridge being introduced into the

" breech end of the barrel." Through the breech plug there works "a sliding rod or striker," which when struck by the hammer is driven inwards, and ignites the cartridge. The cartridges have a flanged metal base, which is seized by the curved end of an extractor fixed "at the end of a rod or stem which slides freely in a passage below the barrel," and is connected with the breech plug in such a manner that when it is moved back the extractor draws out the spent cartridge case.

[Printed, 10d. Drawing.]

A.D. 1865, January 14.—N^o 124.

ANSELL, WILLIAM.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

Barrels that are tilted or turned down to receive the charge are to be fastened by means of a sliding spring bolt working "through the break-off." The bolt has a projection which engages in a catch formed on a stud on the under side of the barrel or barrels. The bolt is drawn back by the finger pulling a projecting piece in front of the trigger guard.

[Printed, 4d. No Drawings.]

A.D. 1865, January 16.—N^o 136.

COTTER, JOHN BERKELEY.—(*Provisional protection only.*)—"Improvements in the construction of shells, and the explosive powder and fuse to be used therewith and for other purposes."

A hollow projectile is proposed to be made with a solid pointed fore part and the rear part hollow and of a rounded shape. A sabot is to be used. The bursting powder is made "of chlorate of potash and realgar in about equal parts."

[Printed, 4d. No Drawings.]

A.D. 1865, January 16.—N^o 138.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Walter Fitzgerald.*)—"Improvements in breech-loading fire-arms."

The piece is charged by means of a self-acting supply tube, from which cartridges are successively pushed into the rear end of the barrel. The breech is closed by means of a breech block attached to and worked by a lever below the stock. As the lever is moved down the block is moved away from the breech end of the barrel.

and a cartridge is pushed out from the tubular magazine formed in the stock and is guided onwards into the breech by a finger, at the same time that the case of the spent cartridge is extracted by a flanged slide.

[Printed, 1s. Drawings.]

A.D. 1865, January 16.—N° 139.

EDGE, JAMES SIMEON, the elder.—“Improvements in breech-loading fire-arms.”

“Drop-down” barrels that are tilted or turned down to receive the charge are fastened by means of “projections formed on either side of the barrel or barrels,” which are engaged with the hooked or curved end of a lever acting at the side of the stock. By depressing the lever “the hooked arms can be raised from the projections with which they engage, and release the barrels.”

[Printed, 1s. Drawings.]

A.D. 1865, January 18.—N° 152.

NEWTON, WILLIAM EDWARD.—(*A communication from Philo Remington, Samuel Remington, and Eliphalet Remington.*)—“Improvements in breech-loading fire-arms.”

The breech plate is “swung back” so as to expose the rear of the barrel when the cartridge is inserted, and the hammer is locked by means of a tooth that takes into a notch in the breech plate. An “auxiliary locking mechanism” is also used, consisting of a pin which by means of a spring is made to bear against the breech piece. Between the hammer is “a tumbler actuated by the hammer,” which “interlocks with the breech-piece” and “supports and braces it against the recoil.” A sear guard is used “to prevent the trigger from being moved when the breech-piece is thrown back to admit the charge.”

[Printed, 1s. Drawings.]

A.D. 1865, January 20.—N° 171.

CLARK, GEORGE ADAMS.—(*Provisional protection only.*)—“Improvements in projectiles.”

Grooves extending from “the point to the base of the projectile in a helical direction” are proposed to be used. The inclined surfaces of the grooves are intended to cause the projectile to rotate on its axis when fired from a smooth bore gun.

[Printed, 4d. No Drawings.]

A.D. 1865, January 21.—N° 188.

SNIDER, JACOB, junior.—“Improvements in fire-arms and in ammunition for the same.”

The breech is closed by a block or breech-piece hinged either at the top or the side of the barrel. A “draw cartridge” or extractor worked by a ratchet action is attached to the breech piece, and so arranged that when it is drawn back the extractor draws out the spent cartridge. Cartridges formed wholly of paper or animal membrane, and which have no base that requires to be extracted, are also used. The fulminate is placed in a capsule and is “covered with a small portion of gun cotton or other suitable material,” which will not “leave a deposit after explosion,” and will prevent “risk of accidental explosion. A striker or needle acting obliquely is made to work in the breech piece, or two pistons are used working horizontally. Barrels are rifled with lands raised upon the surface of the bore of the gun.”

[Printed, 1s. 4d. Drawing.]

A.D. 1865, January 25.—N° 213.

MARSHALL, JOHN, and MILLS, HENRY.—(*Provisional protection only*).—“Improvements in manufacturing ordnance and gun barrels of cast steel or of homogeneous iron.”

Gun barrels are proposed to be made by first forming “a short, thick, solid cylinder” of steel or iron, and boring or punching a hole in it. The cylinder is then to be elongated to form a barrel by the rolling, or drawing, or tilting operations.

[Printed, 4d. No Drawings.]

A.D. 1865, January 28.—N° 247.

TRULOCK, SAMUEL, TRULOCK, RICHARD, and TRULOCK, WILLIAM.—“Improvements in breech-loading fire-arms.”

Barrels that are turned down on the “Lefauchaux” system to receive the charge are locked by a double system of bolts, one locking into a recess below the other at the top of the barrel or barrels. “The bolts are actuated by a single external lever,” which works a cross pin carrying “an internal double lever,” acted upon by a spring. The barrels are fastened by the spring catch, and are released by pressing on the external lever, which draws back the bolts and raises the hammers to half-cock.”

[Printed, 1s. Drawings.]

carriage. The two parts are so made that they may fit "firmly and air-tight together," and the air in the mould is exhausted by an air pump to make a sound casting. The trunnions of the gun are connected with the breech, and the piece is worked by "a roller and lever arm operated by a screw spindle and acting against the under surface of the gun."

[Printed, 1s. 4d. Drawings.]

A.D. 1865, February 3.—N^o 299.

JOYCE, THOMAS.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms."

The breech of the gun is to be closed by "a plate or closer" that is "jointed either on the right or left hand side of the gun." The plate or closer "is provided with a thumb plate by which it can be raised or lowered."

[Printed, 4d. No Drawings.]

A.D. 1865, February 3.—N^o 302.

BARTRAM, WILLIAM.—(*Provisional protection only*).—"A self-adjusting lever powder and shot charger for fire-arms."

A cylindrical tube having a rim at its lower part is to be attached by a screw to the neck of the flask. "A cutter or stopper slides under the rim by means of a lever actuated by the finger," and working on a fulcrum projecting from the cylinder. "The upper part of the lever is grooved" to receive a screw fixed to an upper cutter, "which draws along at pleasure to suit the measure required for the charge." A sliding outer tube, which is adjustable, encloses the cylinder.

[Printed, 4d. No Drawings.]

A.D. 1865, February 4.—N^o 309.

WOOD, STEPHEN WELLS.—"Certain improvements in revolving fire-arms, and cartridges for the same."

Apertures are made "in the periphery of the revolving cylinder, opening respectively into the sides of the cartridge chambers, forward of the rear end thereof, for admitting the point or face of the hammer," which enters through the aperture and explodes the cartridge. A vibrating lever is used for "arresting and retaining" the cylinder in the required position. Metallic or

other cartridges are used, and the fulminate is "placed around
" and sustained by the charge itself either of the powder or ball."

[Printed, 8d. Drawing.]

A.D. 1865, February 6.—N° 321.

MARKHAM, CLEMENTS ROBERT. — (*A communication from William Graham McIvor.*)—"A new method for removing or
" destroying the momentum of heavy bodies by means of an
" elastic machine or machines, so as to prevent injury and damage
" from concussion, applicable to ship cables, ship and fort
" armour, railway trains, tenders, to pier heads and floating piers,
" gangways, breakwaters, and other similar structures, also as a
" motive power."

The cables of ships are wound upon spring cylinders or drums, connected with coiled springs in such a manner that when a rope is strained the spring yields, and afterwards coils itself again. Armour plates are fixed so as not to touch the sides of the ship, but are so attached by joints and supports that when the ship goes into action the plates are projected from the ship and water is admitted between the armour plates and the side.

Ships guns are fired by an electric spark discharged by means of a pendulum so arranged that the discharge takes place only at the time when the axis of the gun is horizontal. Port-holes that are self-adjusting are connected with the pendulum motion. Spring cylinders are applied to supporting armour plates as a backing.

[Printed, 2s. 8d. Drawings.]

A.D. 1865, February 7.—N° 346.

BRANDON, RAPHAEL. — (*Provisional protection only.*)—"Im-
" provement in cannon shot and shells."

Projectiles that may be fired from a smooth bore gun are proposed to be made with side grooves or tubular channels formed in the rear part. When the projectile is to be fired, meal, or other suitable composition, is placed in the rear cavity and is ignited by a fuse or the flame of the powder charge. As the projectile is propelled from the gun the flame from the burning composition issues from the side channels, like the back fire of a rocket, and gives rotation to the projectile.

[Printed, 4d. No Drawings.]

A.D. 1865, February 14.—N° 421.

VON DER POPPENBURG, JOHANN. — “Improvements in
“ breech-loading fire-arms and in cartridges for breech-loading
“ fire-arms.”

The rear end of the barrel is elongated to receive a charge chamber, which is hinged at the side of the barrel, and moves in a horizontal plane, and is bolted in its place by a snap bolt. The discharge is effected “by a central striker, which strikes either
“ upon a percussion cap put on a nipple fixed in the back of the
“ charge chamber, or the said striker forces a needle through a
“ small hole in the back of the said charge chamber and dis-
“ charges the cartridge.” The needle is actuated by a coiled spring. The charge chamber may be turned “into a position at
“ right angles to its normal position, so that when opened its
“ mouth may be brought uppermost, and it may be charged with
“ a bullet and loose powder.” Cartridges for breech loaders are made by forming “in the centre of the base of the projectile a
“ small recess or hole, in which the fulminating powder, encased
“ in metal, is placed.” The needle passes through the gun-
powder “and strikes the fulminating powder through the metal
“ in which it is encased.”

[Printed, 1s. 6d. Drawings.]

A.D. 1865, February 14.—N° 424.

PURDEY, JAMES. — “Improvements in breech-loading fire-
“ arms.”

Barrels which are tilted or turned down to receive the charge are locked by means of a locking bolt “placed vertically in the
“ body of the action, and when the action is locked the bolt
“ enters a recess or notch cut in a steel piece attached to the
“ barrels,” and is held in its place “by a wedge-shaped bolt,” working vertically behind it. The locking bolt is released either by pressing upon a stud upon the top of the stock or pressing down a lever underneath the stock. The striking bolt “works
“ in, on, or over the lock plate, and through the breech piece,
“ and a projection on it is struck by the hammer when it
“ descends;” it is drawn back by means of a stud, which “works
“ in a slot made in the hammer.” The action is adapted for central-fire guns that turn down and for those that are made to

slide forward. The cartridges may be provided with a pin that projects up through the breech and is used to enable the exploded cartridge case to be extracted. In some cases a lever extractor is employed; it works upon a pin attached to the lump or steel piece projecting from the barrels in such a manner that as the barrels are tilted the tail of the lever bears against another lever or finger that projects from the breech piece, and its upper part catches and forces out the exploded cartridge case. When sliding barrels are used a projecting lever catches and retains the rim of the cartridge while the barrel is made to slide.

[Printed, 1s. 6d. Drawings.]

A.D. 1865, February 14.—N° 425.

THOMPSON, BENJAMIN. — (*A communication from Charles Edward Sneider.*)—"Improvements in fire-arms."

A lever motion is employed "to force the stock away from the barrel at the butt end, so as to admit of the charge being introduced." The movement of the lever "in the opposite direction is made to draw the stock and barrel together, and firmly lock and secure them against casual movement." A "lug bar," detachable from the barrel, and secured to it by screws, is used instead of the "old mode of forging or soldering the lugs to the barrel." A lever extractor working underneath the barrel is used to force out the spent cartridge case.

[Printed, 1s. Drawings.]

A.D. 1865, February 14.—N° 426.

THOMPSON, BENJAMIN. — (*A communication from Charles Edward Sneider.*)—"Improvements in cartridges."

A pin is used to explode a percussion cap fixed in the cartridge at right angles to its axis. The base of the cap rests on one "wall" or side of the cartridge case, while the pin passes through an aperture in the side opposite. A moveable cap is used to cover the rear part of the cartridge and prevent escape of gas.

[Printed, 6d. Drawing.]

A.D. 1865, February 23.—N° 506.

AUBIN, WILLIAM HENRY. — (*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

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Barrels that are tilted or turned down to receive the charge are to be fastened by a "tumbler bolt situated in a vertical slot in the "break-off;" it has a motion in a vertical plane, and is "carried by and fitted into a bridle piece let into the back part of the "break-off." When the barrels are shut down the tumbler bolt snaps into a recess or slot between the barrels; it is released by pressing a stud on the strap or tang.

[Printed, 4d. No Drawings.]

A.D. 1865, February 23.—N° 515.

MEYER, ADOLPH, and MEYER, MORITZ. — (*A communication from Wilhelm Gerhardt.*)—(*Provisional protection only.*)—"Improvements in preparing explosive compounds."

A fulminating "salt" is proposed to be made by dissolving 1 part of quicksilver in 10 parts of concentrated nitric acid, and boiling the solution in a basin with 12 parts of alcohol (95 or 100 degrees) until vapours rise. The solution is then cooled; a sediment is deposited, which is filtered and dried as a fulminating salt; 20 parts of fine powder are then mixed with 1 part of antimony and 2 parts of refined saltpetre; 1 part of this mixture and 5 parts of the fulminating salt are then mixed with $\frac{1}{4}$ a part of Roman cement and moistened with dissolved gum to form a paste. When dry it is made waterproof by means of grease.

[Printed, 4d. No Drawings.]

A.D. 1865, February 24.—N° 518.

LANCASTER, CHARLES WILLIAM. — "An improvement in "cartridges for breech-loading guns."

Central-fire cartridges are made with a pin projecting from one side. The pin is not used as a striker but projects through a hole in the rear part of the barrel and "indicates that there is a cartridge in the gun."

[Printed, 6d. Drawing.]

A.D. 1865, February 24.—N° 519.

CLIFTON, HENRY EVERARD, MYERS, SAUL, and HOFFNUNG, ABRAHAM. — (*Provisional protection only.*)—"Improvements in cap carriers for fire-arms."

A "cap carrier" is proposed to be made in the form of "a quadrangular tube with recesses" to hold the caps. The caps

are arranged in two tiers, and are held in their places by springs; they are pushed forward as required for use by moveable "followers," operated upon by elastic cords.

[Printed, 8d. Drawing.]

A.D. 1865, February 25.—N° 540.

ELDREDGE, EDWARD HENRY.—(*A communication from Joshua Gray.*)—"A magazine-repeating and breech-loading rifle."

Metallic cartridges are placed in a tubular magazine in the stock of the piece. A stop is used at the end of the magazine "for the purpose of retaining the cartridges in the magazine when it is desirable to use the rifle as a breech-loader, or to retract the charge." The cartridges are moved from the magazine to the breech of the barrel by a "cartridge carrier," worked by means of a cogged sector moved by a lever rack motion. A "vibrating blade of metal entering a slot one side of the barrel, and confined at its lower end by a pivot," is used as a cartridge extractor, when the piece is made to act as a self charger. A hooked lever worked with a cam is used as an extractor when the piece is fired as an ordinary breech-loader.

[Printed, 1s. Drawings.]

A.D. 1865, February 27.—N° 550.

ROYS, THOMAS WELCOME, and LILLIENDAHL, GUSTAVUS ADOLPHUS.—"Improvements in rocket guns and rocket harpoons and apparatus to be used therewith, for the capture of whales and other purposes."

The improvements are based upon those described in the Specification of prior Letters Patent dated February 22, 1861, N° 450. A shell rocket is attached to a harpoon line, and is placed in a rocket tube or gun having a longitudinal groove or open slot on the under side, and another in the fore part of the upper surface, to allow the back fire of the rocket to escape. The marksman is protected by folding flaps from the back fire. The rocket is fired by means of a pistol attached to the rocket tube which ignites the rocket composition.

[Printed, 8d. Drawing.]

A.D. 1865, February 27.—N° 552.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Timoleon de Bourrousse de Laffore.*)—(*Provisional protection only.*)
—“A combined key and weapon of defence.”

“The shaft of the key” is proposed to be hinged to the ring or handle, “within or upon which it folds.” The ring is held in the hand, and forms a “weapon of offence.”

[Printed, 4d. No Drawings.]

A.D. 1865, March 8.—N° 642.

TOLHAUSEN, FREDERICK.—(*A communication from John Webster Cochran.*)—“Improvements in beech-loading fire-
“arms.”

The breech is closed by a hinged breech block, which is worked vertically by a lever trigger guard below the stock. A cavity is provided “in the under side of the breech block for the reception
“of the cartridge, whereby the movement of the said block which
“is necessary for the insertion of the cartridge, is greatly reduced,
“and the discharged cartridge shells are steadied while being
“withdrawn from the barrel.” Metallic cartridges are used, and when spent the cartridge case is extracted by a rod extractor having a projection which catches the rim of the cartridge and draws it back towards the stock as the breech block is raised to allow another cartridge to be inserted in the breech end of the barrel.

[Printed, 1s, 8d. Drawings.]

A.D. 1865, March 9.—N° 659.

CLARK, WILLIAM.—(*A communication from Sébastien Amédée Noël and François Gueury.*)—“Improvements in revolving fire-
“arms.”

A revolving disc, in the periphery of which are chambers for receiving cartridges, is mounted on an axis at right angles to the axis of the barrel. The revolving chamber piece is mounted in a frame, and is turned by a ratchet wheel motion. The improvements are described as being “applicable to all kinds of fire-
“arms, from the pocket pistol to cannon of largest calibre.”

[Printed, 1s. Drawings.]

A.D. 1865, March 14.—N° 708.

BRAENDLIN, FRANCIS AUGUSTUS.—(*Partly a communication from William Montgomery Storm.*)—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

The charge chamber is "hinged to the top of the breech end of the barrel," and is raised and "thrown back on to the top or side of the barrel for reloading." To enable cartridges that contain their own ignition to be used, "the upper part of the hammer is bent or cranked nearly at right angles to the other part, and a cylindrical bolt, "having a pin or point at its end," is connected to the end of the cranked part. In the rear of the hinged charge chamber is a hole, through which the point of the striker is driven, when by pulling the trigger the hammer is depressed. Central-fire cartridges are used. In the rear end of the cartridge is placed a percussion cap, "kept central by means of a disc of card or paper," which has a perforation to hold the cap. Behind the cap and disc "a small quantity of ordinary powder is placed;" the point of the striker passes through this powder and ignites the cap, which is then, together with the disc, blown out of the gun. In some cases the pointed striker may be made to work in the hinged charge chamber; "in this case the sliding bolt strikes against a rod carrying the pin or point, and "projects it into the cartridge."

[Printed, 1s. 2d. Drawings.]

A.D. 1865, March 14.—N° 711.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Samuel Maynard.*)—"Improvements in breech-loading fire-arms."

Metallic cartridges are used, the metallic base forming a "gas check." The rear end of the barrel is closed by a plate which is rigidly attached to another plate lying on the top of the rear end of the barrel, and connected to it by a hinge joint. The two plates are at right angles to one another, the upper one being horizontal, while the back plate which closes the breech of the barrel is vertical. The back plate works in a vertical slot inclined backwards on the rear side, so that the plate may be raised up to unclose the breech and admit the cartridge. A sliding piece works vertically behind the breech plate, and is lifted by hand before

the plate is raised. When it is shut down the sliding piece is pressed down and locks the breech plate in its place. The spent cartridge case is extracted by means of a sliding finger piece working parallel to the axis of the barrel, which catches the metallic rim of the cartridge and pushes it out.

[Printed, 8*d*. Drawings.]

A.D. 1865, March 20.—N^o 772.

COOK, JOHN THOMAS, and COOK, JOHN THOMAS the younger.—“Improvements in breech-loading fire-arms.”

The breech end of the barrel is closed by a block hinged at its forward end to the top of the barrel. The breech block is fastened when in its place by a spring bolt working horizontally in the stock of the gun, and entering “in a recess or opening in the “rear of the” breech block. A lever having an arm projecting above the top of the breech block is pressed forward when the block is raised, the lower arm of the lever pushes back the spring bolt and releases the breech block, which may be then raised to receive the cartridge. Central fire cartridges are used, an inclined striker being made to work in the breech block. The spent cartridge case is extracted by means of a bar having a projecting “cross stud at its end, which acts as a hook. The bar “works “freely endwise” in a groove formed on one side of the hinged block. “As the breech block is raised after discharge, the free “end of the bar or strip descends in the groove in the block, “and the other end is made to advance in its slot towards the “butt end of the gun, and cause the hook of the extractor to push “before it the exploded cartridge case and extract it from the “barrel.”

[Printed, 1*s*. 2*d*. Drawings.]

A.D. 1865, March 21.—N^o 783.

GREENE, WILLIAM VINCENT.—(*Provisional protection refused.*) —“Improvements in vessels of war and in ordnance.”

It was proposed to construct the hull of the vessel in two parts separate from one another. In the lower part are mounted the guns, and the upper part is used for the accommodation of the crew of the ship. Heavy guns are proposed to be fired with their breech ends fixed to a tube filled with water, which is to resist the recoil. Or the recoil is taken off by making the gun act upon a

series of steel discs or springs, or embedding it in elastic or fibrous materials.

[Printed, 4*d*. No Drawings.]

A.D. 1865, March 21.—N° 790.

GATLING, RICHARD JORDAN.—“Improvements in fire-arms.”

A gun composed of a series of barrels which revolve round a central shaft in a frame, is mounted on a gun carriage, or on a rotating platform or turntable. The shaft is turned by a crank worked by a handle. Upon the central shaft, and connected thereto by two discs forming the ends of an enclosing cylinder, are a series of barrels, four are described in the Specification; the breech ends of the barrels are fixed in the rear disc, the muzzles in the forward disc. The enclosing cylinder turns on the central shaft, and is filled with water or other liquid or other suitable matters for the purpose of keeping the barrels cool. In the rear of the barrels is a cylindrical piece or “cartridge carrier,” containing four chambers for receiving cartridges, and behind that is another cylindrical piece or “lock cylinder,” containing four strikers, and actuating mechanism and an extractor connected with each striker. Metallic cartridges are used, and are supplied from a cartridge box which is placed on the top of the framing of the piece. When the piece is fired, the gunner turns the handle of the crank, and as the framing is turned each barrel is brought in succession to the top, a cartridge is fed into a chamber of the cartridge carrier, is carried round, forced into its place in the breech of the gun, is discharged by a striker, and the spent cartridge is extracted before the barrel again comes round to the top, when the action is repeated.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1865, March 22.—N° 800.

TRONCHON, ALFRED PIERRE.—“Improvements in the construction of fire-arms, and in cartridges for the same.”

The cartridges used are contained in a tubular magazine in the stock of the gun. The breech-piece “is mounted on an axis, and “it has to describe an arc of a circle to open or close the end of the barrel; this motion is communicated to it by a lever, which “acts on an inclined plane on which a projection is free to slide, “formed at the base of the piece to cause it to describe [the

“ necessary arc in order that the breech opens the opening in the
 “ end of the barrel, and which is also closed when the charge has
 “ been introduced, for at the same time that the lever causes the
 “ breech to open it communicates by a knee piece a sliding
 “ motion to the rack carrying the cartridges, and to the piece
 “ which introduces the first cartridge into the chamber of the
 “ arm.” The return motion of the lever closes the breech and
 “ advances all the other cartridges. Besides the forward rack
 “ there is another rack in the rear, one rack having “a downward
 “ motion to allow the cartridges to pass and keep them in position,
 “ while the second makes a to-and-fro motion to bring forward,
 “ and at the same time guide the cartridges. The cartridges
 “ contain their own ignition ; the base of the cartridge left after
 “ explosion is pushed forward by the succeeding cartridge.”

[Printed, 10*d*. Drawing.]

A.D. 1865, March 23.—N^o 814.

CROWE, CHALES HENRY. — (*Provisional protection only*).—
 “ Improvements in stoppers for bottles, jars, or other vessels, the
 “ same being applicable to fire-arms and ordnance.”

A stopper is proposed to be made, by preference of wood, in
 parts which are divided longitudinally, and attached to a stem.
 The parts form a hollow at the lower end of the stem into which
 “ a conical plug is forced by a screw, an elastic covering on the
 stop is thereby expanded and closes the opening or muzzle in
 which the stopper is inserted.

[Printed, 4*d*. No Drawings.]

A.D. 1865, March 24—N^o 838.

ARNOLD, DANIEL.—“ Improvements in gun-locks.”

A safety catch is employed to fix the hammer. An angular
 point is formed on the tumbler and takes “into a notch in the
 “ sear, such that it holds the tumbler, and consequently the
 “ hammer fixed,” so that it cannot be moved without detaching
 the sear from the tumbler by applying the finger to the trigger.

[Printed, 8*d*. Drawing.]

A.D. 1865, March 30.—N^o 902.

NEWTON, ALFRED VINCENT.—(*A communication from Robert
 Augustus Chesebrough.*)—(*Provisional protection only.*)—“ An im-
 “ provement in the construction of cartridge and other boxes.”

The cartridge box is to be made with end pieces, each having "a short pivot pin, upon which pins hang a pair of grooved plates attached to or forming the ends of an inner receptacle or box." The inner box is made "with upper and lower compartments" for receiving cartridges. Covers of leather are attached to the inner box.

[Printed, 4d. No Drawings.]

A.D. 1865, April 3.—N° 932.

VON DER POPPENBURG, JOHANN.—"Projectiles and cartridges for central-fire breech-loading fire-arms and ordnance." The projectile is made with a recess in its rear part, and in the middle of the recess is a projection which is made to act as the anvil of the percussion cap, which is fixed upon it. The powder charge is attached to the rear of the projectile, and is fired by means of a striker which is made to penetrate through the powder and strike the cap. In making a blank cartridge the anvil is fixed upon the base of a cup placed in the front of the powder, and the percussion cap is placed upon the anvil.

[Printed, 8d. Drawing.]

A.D. 1865, April 4.—N° 952.

CLARK, WILLIAM.—(*A communication from William Davis Winsor.*)—"Machine for rounding and polishing shot, shell, and other balls or spheres." Four "longitudinally sliding rotary mandrils," or a greater or less number, are mounted in a cast-iron frame made in the form of a cross. The mandrils radiate from a common centre, and are provided with chucks at their inner ends, in combination with suitable mechanism to force these chucks alternately up against the ball to be turned or ground, and with a milling tool or grinding wheel, in such a manner that two of the chucks will clamp the ball at a time, and the ball is thereby turned in either direction, while the grinding wheel or milling tool is held in contact with the surface of the ball by one or more screws or by an adjustable weight." The chucks are so shaped "as to grasp the general surface of the ball," and not be affected in position by inequalities on its surface.

[Printed, 1s. Drawing.]

A.D. 1865, April 5.—N° 969.

LANCASTER, CHARLES WILLIAM.—"Improvements in fire-arms, and in apparatus for extracting cartridges and cartridge

"cases therefrom." A breech-loading gun is made with a sliding breech plug moved by a projecting piece, which serves to turn the plug and lock it and unlock it, as required, in the usual way. In the breech plug is a striking bolt which is actuated by a spring, and "takes the place of, and is acted upon in the same way as" the ordinary pointed needle, it is only of sufficient length to "strike the rear end of the cartridge," which is of metal, carrying a "detonating composition." In order to extract the spent cartridge case "a semi-annular plate corresponding to the bore of the piece" is used as an extractor. It is "carried on the front end of a bar free to slide backwards and forwards in a groove in the bottom of the breech." The extractor catches the rim of the cartridge and is drawn back by the sliding breech plug.

[Printed, 8d. Drawing.]

A.D. 1865, April 7.—N° 987.

MUIR, ANDREW. — "Breech-loading fire-arms." The breech is closed by a "breech plug or charge chamber" which is mounted "at its rear end upon a spindle-formed eccentric, with pivots or pins working in holes in metal straps, forming the side of the recess" in which the plug works. The plug or charge chamber is "first caused slightly to recede to free the nose or fire end from the recess in the barrel and then to rise or fall to any required angle for the purpose of exposing the breech end of the barrel or the muzzle of the charge chamber." The breech plug is worked by a lever handle at the side of the barrel. It is depressed to allow the cartridge to be inserted in the rear end of the barrel, or when it acts as a charge chamber it is raised and the cartridge is inserted in the charge chamber from the front. The breech plug is then moved into its former position and its front end is forced into the rear end of the barrel, making a tight joint. Either the percussion system, or the striker system with cartridges carrying their own ignition, may be employed.

[Printed, 10d. Drawing.]

A.D. 1865, April 8.—N° 1014.

HAUSMAN, JEAN BAPTIST.—(*Provisional protection only.*)—"Improved apparatus for supporting and steadying the arm in rifle shooting."

A rest for a rifle is proposed to be made by fixing an adjustable rod in a socket, attached to a strap, which is to be fastened round the left leg of the marksman. The rod may be of steel and be made of tubes which slide up and down and are fixed at the required height by screws.

[Printed, 4d. No Drawings.]

A.D. 1865, April 12.—N° 1046.

MAYALL, THOMAS JEFFERSON.—“Improvements in fire-arms, “and in cartridges to be used therewith and with other fire-arms.”

The breech of the breech-loading gun is closed by a sliding compound breech bolt formed of two parts, “one part embracing “and being capable of partial rotation upon the other. The bolt “is moved and turned by a projecting handle; when it is turned “the bolt is locked. A striker is made to act in the bolt, and “cartridges containing their own ignition are used. A fork “extractor is attached to the breech bolt, and is moved back with “it so as to withdraw the spent cartridge case.

Cartridges are made with the front part formed of paper, in which are placed a number of shot, which diverge when the charge is fired.

A revolver is made with the butt end “connected with the “other parts by a hinge joint, at or near the back end of the “charge cylinder,” the parts being held by a spring catch. By this means “facilities are given” for effecting a change or replacement of the cylinder or other parts.

[Printed, 2s. 6d. Drawings.]

A.D. 1865, April 12.—N° 1049.

BICKFORD, JOHN SOLOMON.—“The manufacture of an improved safety fuse.”

The ordinary “Bickford’s fuse,” the subject of a prior Patent, dated September 6, 1831, is coated with a special composition “to “prevent the fire from bursting through the coating.” The fuse is coated with tar varnish and “then covered with another layer “of yarn. It is then coated with a composition composed of 17 parts of fine potters clay, one part of glue, one of red lead, and one of alum, by weight. The glue and alum being dissolved in hot water are mixed with the clay and red lead to form a paste;

this is applied to the fuse, which is then again covered with yarn and again coated if required, the operation being repeated six times, or more if necessary.

[Printed, 4d. No Drawings.]

A.D. 1865, April 17.—N° 1071.

HENRY, ALEXANDER. — “Improvements in breech-loading fire-arms.”

When central fire cartridges are used a piston or striker, which strikes the end of the cartridge directly, is made to work in the lock in a position concentric with the barrel. The striker is moved by an “elongated back or shoulder” upon the tumbler of the lock. For pin cartridges the face of the lock is elongated.

A “cartridge case extractor” is attached to a bar which passes through a solid lump fixed underneath the barrels, “the back face of the extractor being formed with a curved face, which, as the barrels are tilted, moves another piece of metal of a quadrantal form arranged in the stock, and, being placed excentrically with the stock on which the barrels oscillate, causes the extractor to be moved forward.”

A solid piece of steel “of a circular form” is fitted “by dovetails across the body of the stock,” and corresponds “to a curved opening made in the solid metal beneath the barrels;” when necessary, it may be “removed for rejoining and be replaced by another piece.

In some cases a breech piece is constructed “with a strap or projection for fixing it to the stock,” and the barrel is screwed into it. An opening is made to receive a moveable breech, worked by a lever, which also works a “pronged extractor.”

[Printed, 1s. Drawing.]

A.D. 1865, April 19.—N° 1092.

BOUSFIELD, GEORGE TOMLINSON.—(*A communication from Henry Oliver Peabody.*)—“Improvements in breech-loading fire-arms.”

The breech is closed by a hinged or “swinging breech piece,” which works on a horizontal axis at right-angles to the axis of the barrel. The breech piece is raised and depressed by the short arm of a bell crank lever, the long arm of which forms the trigger guard.

The breech block turns on a pin "passing through the upper " part of the rear end of the block and through the sides of the " frame" in which a "parallel sided" mortice is formed. The block is depressed, to allow the cartridge to be inserted in the barrel, by the action of the lever the head of whose short arm works in a recess formed in the under side of the breech block.

In some cases the short arm may be forked, or a pin may be fitted into its head so as to move the breech block. When the breech block descends it strikes against the lower and horizontal arm of an elbow lever whose upper and vertical arm catches the metal flange of the exploded cartridge case and extracts it. The breech block is held "in its respective positions for loading and " firing" and is also returned "to a position at which a groove " upon its upper surface shall coincide with the bore of the " chamber to facilitate the insertion of another cartridge," by the action of a spring bar. The spring bar is attached to the front part of the under side of the breech block and its rear part "rides " upon a friction roller mounted in the breech frame." In the bar are formed notches which alternately rest upon the roller and thereby hold the breech block in position for loading or firing respectively. "The top surface of the breech-piece is formed with " a tapering groove," which corresponds with the bore when the block is in position for loading.

[Printed, 10d. Drawing.]

A.D. 1865, April 20.—N^o 1103.

HALE, WILLIAM.—"Rockets." The improvements are based upon those described in No. 1220, A.D. 1862. [See Appendix.] The central aperture therein described is dispensed with, and "three 'apertures with the half tubes," used for giving rotation, are brought "near the axis of the rocket;" this part is made "a separate casting," and is "rivetted in the base of the rocket " before charging." The central part of the base is "previously " bored out and tapped," so that the separate casting can be screwed into it. "In charging the rocket a plug the thickness of the base " is inserted in the central aperture" temporarily; it is afterwards withdrawn, "and the rocket bored up in the ordinary way."

[Printed, 10d. Drawing.]

A.D. 1865, April 24.—N^o 1136.

FONTAINE MOREAU, PETER ARMAND LE COMTE DE.—(*A communication from M. J. E. du Liège de Puychaumeix.*)—(*Provisional protection only.*)—"Breech-loading fire-arms." The

gun is proposed to be made with a barrel that slides to and from the butt. The barrel is to be secured by a "jointed catch" when it is charged and fired.

[Printed, 4d. No Drawings.]

A.D. 1865, April 24.—N° 1146.

CARLE, JOHN FREDERIK CHRISTIAN.—"Breech-loading needle-guns." The barrel is made to slide in a horizontal direction in a kind of slide joint. The needle is contained in a cylindrical piece, having thereon at one end a tapered collar; within it is "a hollow plunger," through which the needle passes. The barrel is opened to receive the charge by means of an eccentric moved by a lever, which is also used to "cock the needle." The barrel is secured by a guide piece, so that it is perfectly rigid laterally.

[Printed, 1s. Drawings.]

A.D. 1865, April 27.—N° 1177.

CARR, JAMES.—Breech-loading fire-arms, ordnance, and projectiles. The breech of the gun is closed by a sliding wedge breech plug, which works in a recess in the rear of the barrel; a hinged plate or lid covers the recess. For needle-guns a striker is made to "pass through the top of the cover and through the fore part of the plug or plunger, so as to strike, on the descent of the hammer upon it, the self-igniting cartridge at its rear end." In the fore end of the projectile "a hole or depression" is made which "constitutes a wind centre about which the projectile rotates," and so gives "great precision to its flight."

[Printed, 1s. 2d. Drawings.]

A.D. 1865, April 27.—N° 1182.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from T. J. Thackeray.*)—"Apparatus for charging and closing cartridge cases." Upon a bed plate is "mounted a vertical rod," on which is "pivoted" a charger tube, "flanged at bottom and fitted inside another tube," which may be pressed down, and is then raised by a spring. A cylinder for containing the cartridge case is made to slide in a groove in the bed plate in such a manner that the cartridge case may be placed under the charger tube and be filled, first with powder and wad, and then with shot and wad, and afterwards be closed by being acted upon in a horizontal position by a revolving "closer."

[Printed, 10d. Drawing.]

A.D. 1865, April 29.—N° 1127.

BROADWELL, LEWIS WELLS.—"Breech-loading guns."

The breech of the gun is closed by a wedge breech piece, moved by a screw. In order to make a gas-tight joint, a "conical gas ring" is used, being "in a corresponding chamber in the bore of the gun." In some cases "an adjustable bearing plate" is also used, being placed in "a chamber in the face of the breech plate." The gas ring and bearing plate may be used in combination or separately.

[Printed, 1s. 2d. Drawings.]

A.D. 1865, May 1.—N° 1207.

DELLA-NOCE, EMILE.—(*Provisional protection only.*)—"Improvements in fire-arms."

A self-acting feeding tube is proposed to be used for supplying percussion caps to the nipple of a gun. The tube is to be fixed at the side of the barrel, and "connected to the lump which carries the nipple." The caps are moved by a slide, and placed on the nipple.

[Printed, 4d. No Drawings.]

A.D. 1865, May 1.—N° 1209.

JOHNSON, GEORGE.—"Improvements in iron fortifications, such improvements being applicable to the construction and protection of ships and floating batteries."

Oblique-sided casemates and sloping breast works are made by covering timber work with armour plates. "A cylindrical shield or traverse port" is applied to embrasures to protect guns and gunners, and the recoil of the gun is made to close the port. "Armour plates, ribs, and other portions of ships' batteries and ports" are joined together "by means of opposite dovetail or other undercut grooves," which are filled by pouring molten metal into them. In some cases "divided keys" are used to hold together plates or parts forming the various structures.

[Printed, 2s. 8d. Drawings.]

A.D. 1865, May 1.—N° 1211.

BLACKIE, JOHN, junior.—(*A communication from Thomas Taylor.*)—(*Provisional protection only.*)—"An improvement in igniting the fuses of shells."

The shell is proposed to be made with "a corrugated or plain hood, kept at a slight distance from the face of the shell, for

" the purpose of directing the flame from the powder to the fuse
 " to cause the ignition thereof." Side channels are made in the
 front part of the shell, so that the flame may reach the fuse.

[Printed, 8d. Drawing.]

A.D. 1865, May 9.—N^o 1276.

LAW, STEPHEN, and LAW, JOSEPH.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms."

The barrel which is tilted or turned down to receive the charge, is to be fastened "by means of a bolt, turning upon a centre near
 " the top of the break-off, and having a motion in a vertical plane
 " upon the said centre." The bolt is urged by a spring, and is moved by a lever; "its bevilled end" engages in a recess in a lump placed beneath the barrel.

[Printed, 4d. No Drawings.]

A.D. 1865, May 9.—N^o 1289.

CONYBEARE, JOHN CHARLES.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms and cartridges."

At the rear end of the barrel of the gun, a charged chamber is proposed to be fixed, and attached to the breech plate by a hinge joint at its upper rear end. The charge chamber is turned up to allow the cartridge to be inserted. In some cases a lining tube is used for the charge chamber. The chamber is made to form a joint, at an angle to the axis of the barrel, to allow it "to turn
 " upwards about its joint for loading."

Cartridges containing their own ignition are used, and the fulminating composition is attached to a disc or ring placed at the back of the cartridge tube.

[Printed, 4d. No Drawings.]

A.D. 1865, May 10.—N^o 1293.

O'HAGAN, PATRICK.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms."

The barrels of the gun are to be made to swivel on either side, so as to allow the charges to be inserted in their rear ends. The barrels turn upon an axis "perpendicular to the plane in which
 " the axes of the barrels are situated." The ends of the barrels are curved, to fit "the concave face of the break-off."

[Printed, 4d. No Drawings.]

A.D. 1865, May 10.—N° 1300.

RÉVY, JULIAN JOHN.—“Improvements in the manufacture of gun-cotton cartridges for cannon and small arms.”

The gun-cotton cartridge is made by winding a loose roving of gun cotton round a stiff central tube of cardboard or other material, the roving being wound on in a state of tension, and being at the same time pressed by a roller, so as to give the required density to the gun cotton, which is by preference made equivalent to that of 25 lbs., occupying the space of a cubic foot.

The gun-cotton cartridge is subdivided “into at least two ‘separate charges,’ separated by a strong dividing medium, made by preference in the form of a cylinder, one charge being placed outside round the cylinder, the other inside it, the charges are made up of gun cotton of different densities. The charges are fired by igniting a cap, placed in the base of the cartridge in the usual way, the fire from the cap being made to communicate with both outer and inner charge.

[Printed, 10d. Drawing.]

A.D. 1865, May 11.—N° 1308.

COOPER, JOSEPH ROCK.—“Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms.”

The breech of the barrel is closed by a sliding plug, and its front end is made to act as an extractor, so as to withdraw the case of the spent cartridge. This is effected, by forming “a central undercut projection” on the front of the sliding plug, which enters into a corresponding recess formed in the metal base of the cartridge. When the charge is fired, the metal base of the cartridge is expanded, and is made to attach itself to the sliding plug, which when it is moved back extracts the spent cartridge case. A similar result is obtained by making an undercut depression in the front of the sliding plug, and forming a projection on the base of the cartridge.

[Printed, 8d. Drawing.]

A.D. 1865, May 13.—N° 1328.

CRAIG, THOMAS.—“Improvements in breech-loading fire-arms and ordnance, and in apparatus connected therewith.”

The breech is closed by a breech plug hinged at its rear end and turning upon an eccentric, so that when the plug is shut

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down in its place it is pushed forward and its front end engages in a recess in the rear end of the barrel. The breech plug may be made to contain a charge chamber, or a needle striker actuated by a coiled or other spring. Self-igniting cartridges are used. A cartridge extractor, consisting of a curved piece attached to a sliding bar, works in a groove in the recess which receives the breech plug. The bar is moved by a link attached to the breech plug, so that when it is raised the curved piece attached to the bar catches the rim of the base of the cartridge and extracts the spent cartridge case.

[Printed, 1s. Drawing.]

A.D. 1865, May 13.—N° 1332.

SPENCE, WILLIAM.—(*A communication from John Scipel.*)—*(Provisional protection only.)*—"Improvements in the mode of rifling muzzle-loading cannon, and in projectiles for the same."

The barrel of the gun is to have two sets of rifling grooves formed in its interior of different sizes. Projections are formed on the projectile, and it is to be made to enter by the large grooves, and when it is fired it is rifled by the action of the smaller grooves.

[Printed, 4d. No Drawings.]

A.D. 1865, May 15.—N° 1341.

DEAKIN, WILLIAM, and JOHNSON, JOHN BAGNALL.—*"Certain improvements in the manufacture of gun barrels and ordnance."*

The improvements are based upon those described in the Specifications of prior Letters Patent, dated respectively April 24, 1863, N° 1024, and January 19, 1864, N° 139, and November 9, 1864, N° 2784. Gun barrels and tubes for ordnance are made by forming an ingot of a suitable size and shape by the usual processes of forging or rolling. A central hole is then drilled in the ingot, and a larger hole is afterwards punched out, and the ingot is then formed into a gun barrel or tube by elongating it to the requisite extent by subsequent heatings and forgings or rollings.

[Printed, 4d. No Drawings.]

A.D. 1865, May 16.—N° 1355.

LAFONT, PIERRE CAMILLE.—*"Improvements in apparatus to be used with breech-loading fire-arms and ordnance."*

A cartridge is made up of two parts, one containing the charge, the other the ignition cap and striker, to which a spring is attached. The part containing the striker is, with its cap, attached to the part containing the charge when the cartridge is about to be discharged. The spent cartridge case is withdrawn after discharge, and the striker may be again used and attached with a fresh cap to another charge.

[Printed, 6d. Drawing.]

A.D. 1865, May 16.—N° 1356.

BROOMAN, RICHARD ARCHIBALD.—(*A communication from Charles Rochaz.*)—"Improvements in breech-loading fire-arms, "and in cartridges and bayonets for breech-loading arms."

A rod or bar is cast upon the under side of the barrel, which slides in a groove made in a projecting part of the breech plate. The trigger guard acts as a lever, and on the end of its short arm is a hook, which engages in a notch in the bar fixed underneath the barrel and fastens it in its place when the piece is ready to be discharged. Cartridges with flanged bases are used and are ignited by a needle or striker. In place of a ramrod a tube is carried which is made to act as a bayonet; it has a socket for attaching it to the barrel like the ordinary bayonet socket.

[Printed, 1s. Drawings.]

A.D. 1865, May 19.—N° 1382.

EBRALL, SAMUEL.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

The barrels which are tilted or turned down to receive the charge are to be fastened by a "snap spring bolt" which works in a recess in the break off. The bolt is to be drawn back by a lever motion worked by the trigger guard.

[Printed, 4d. No Drawings.]

A.D. 1865, May 22.—N° 1403.

BIGORIE, ANDRÉ GUSTAVE.—"A new kind of casing intended "to protect the stock and lock of fire-arms, with guiding caps to "take aim."

A sheath "of leather, or other supple material or thin metal," is used for covering the stock of a gun and preserving it from

shocks and injury. A cap or cover of vulcanised india-rubber is used for covering the cocks and locks of the gun and preserving them from wet. In the case of double barrel guns the cover is so shaped as to "guide the aim" of the marksman, the sight being taken between the projections of the cover.

[Printed, 8d. Drawing.]

A.D. 1865, May 25.—N° 1433.

PATON, EDWARD.—(*Provisional protection only.*)—"Improve-ments in fire-arms."

The barrels, which are hinged to the stock of the gun, are to be fastened when in position by a catch, which may be "caused to move laterally on a pin or centre," and be released by "a thumb lever," or by the action of the trigger guard. In some cases the catch may be "fixed upon a horizontal pin," placed in a piece of metal attached to the breech plate.

[Printed, 4d. No Drawings.]

A.D. 1865, May 25.—N° 1436.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improve-ments in breech-loading fire-arms and ordnance, and in cartridges for breech-loading fire-arms."

The breech of the gun is to be closed with a breech block "hinged to the top or upper side of the breech," and fastened when in its place by a bolt sliding in the break-off. The block is released and raised by a lever jointed to its rear end, which forces back the sliding bolt and opens the breech. The sliding bolt may be connected by "a cranked rod or stem" to a cartridge extractor. A striker actuated by a spring may be made to work in the breech block either in an oblique direction or in a line with the axis of the barrel. In some cases barrels hinged to the break-off are used. In the case of ordnance the breech is to be closed by a transversely sliding breech block moved by a pinion action. A cartridge may be made with a metallic base attached to the tubular part "by soldering or brazing." A paper cartridge may be made with the base closed by a felt wad.

[Printed, 4d. No Drawings.]

A.D. 1865, May 27.—N° 1461.

BISSELL, THOMAS.—"Improvements in breech-loading fire-arms and in sights for rifles."

Barrels that are tilted or turned down to receive a cartridge are employed. In order to extract the spent cartridge case a sliding "extractor piece" is used, which is moved "by a lever acted on by an incline on the breech plate." The striker is actuated by a spring "made from a strip of metal wound spirally around a cone."

The back sight has a leaf or flap "turning at its lower end on a rule joint;" a spring is attached to it, which when the flap is vertical presses on a "flat surface fixed at one end of the hinge" and presses back the flap as far as the joint will allow."

The back sight may be moved by a screw or rack motion so arranged that the "slider may be readily thrown out of gear with the screw or rack," and then be moved quickly by hand.

[Printed, 1s. Drawing.]

A.D. 1865, May 27.—N° 1463.

BUSSEY, GEORGE GIBSON.—"An improved method of loading and turning over the shells of cartridges and in the machine used for the same."

Six or any other convenient number of cartridge cases are placed in a frame or holder where they are held down by the hinged lid in such a manner that the open ends are upwards. The cartridges are charged with powder and shot, and the holder is then made to slide through a frame, and as each cartridge "is brought opposite the coiler the handle is turned, and the coiling or turning over takes place."

The coiler made with "a screw or spindle with a crank handle, the end of the said screw or spindle being cupped out, as is usual for the purpose of coiling down cartridges."

[Printed, 4d. No Drawings.]

A.D. 1865, June 1.—N° 1505.

ALLMAN, HERBERT.—"Certain improvements in the formation and construction of metallic vessels, chambers, or hollow cylinders used in hydraulic apparatus, cannon, or heavy guns, and for like purposes."

Guns, cylinders, and other articles are strengthened by first coiling clean wire or strips of steel round the surface of the cylinder, then washing with solution of carbonate of soda and with water. The work is "next completely wetted by a saturated solution of

the barrel is used. The hammer is forced upwards by a spring and enters a slot in the sliding plug that carries the striker, it then propels the striker against the rear of the cartridge and discharges the piece.

[Printed, 1s. 8d. Drawings.]

A.D. 1865, June 13.—N° 1595.

HASELTINE, GEORGE.—(*A communication from Frederika Schenkt.*)—"Improvements in fuses for shells for ordnance."

The fuse charge is contained in a long tubular sheath, which "is fitted to a case screwed into the projectile." A series of holes are made in the fuse case "in a helical direction along its length, and a similar series along the fuse tube in the opposite direction." The fuse tube may be turned round, and when the required holes in the fuse tube and the case are brought into line the fire is communicated at the required time to the bursting charge. The fuse is fired by the action of a striker whose holding pin is released when the projectile is discharged from the gun.

[Printed, 6d. Drawing.]

A.D. 1865, June 17.—N° 1636.

KLEIN, AUGUST.—(*A communication from Gustav Adolph Neumeyer.*)—"Improvements in gunpowder for mining and war purposes."

"75 parts by weight of saltpetre are mixed with about 18·75 parts by weight of charcoal and about 6·25 parts by weight of flower of sulphur to form 100 parts of gunpowder." The charcoal is by preference made from pieces of birch wood, which are ignited and then placed in a "hermetically closed receptacle." The charcoal is "soaked in soda lye, and is dried on canvass strainers," and then pulverized. This gunpowder "when ignited in an unconfined space burns quietly and slowly;" in a confined space it explodes with a force equal to that of ordinary powder; its specific gravity is less and its cost is less than that of ordinary powder.

[Printed, 4d. No Drawings.]

A.D. 1865, June 20.—N° 1651.

COLLEY, ABRAHAM.—(*Provisional protection only.*)—"Improvements applicable to breech-loading fire-arms."

An expanding breech plug is proposed to be employed to close the breech of the gun; it is to be made in parts by placing conical split rings on the plug in such a way that when the piece is fired the parts of the plug are forced together, and the split rings are forced outwards so as to make a gas-tight joint.

[Printed, 4d. No Drawings.]

A.D. 1865, June 22.—N° 1679.

GALE, JAMES, junior.—“Improvements in preparing and treating gunpowder.”

Gunpowder is rendered “non-explosive when in store” by mixing with it a dry fine “unexplosive or incombustible powder finer than the finest grains of the gunpowder.” Various powdered substances may be used, ivory or bone black, or glass powder are preferred, the latter being the cheaper. About three parts by weight of the non-explosive powder may be used with the gunpowder. When the gunpowder is required to be used the mixed non-explosive powder is separated from it “by sieving or winnowing.”

[Printed, 4d. No Drawings.]

A.D. 1865, June 30.—N° 1738.

TIPPER, HENRY POWELL.—“Improvements in manufacturing gun barrels and tubes of cast steel and homogeneous iron.”

A hollow cylinder of steel or homogeneous iron is formed by casting the molten metal in a mould. The thickness of the cylinder is not less than two inches in any part. The cast cylinder is then heated, and, if necessary, hammered to close the pores of the metal; it is then rolled by passing it through suitable grooved rollers until it is sufficiently elongated, and made of the requisite diameter for a gun barrel.

[Printed, 1s. Drawings.]

A.D. 1865, July 1.—N° 1750.

NEWTON, WILLIAM EDWARD.—(*A communication from Pierre Didier Jardinier.*)—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms, and in cartridges to be used therewith.”

The hammer used to drive forward the striker or needle is to be “mounted at the under part of the lock in a line with and in

“front of the ordinary trigger; it projects upwards a sufficient distance to drive forward the needle behind the cartridge, and terminates below in a trigger which is pressed forward for the purpose of cocking the arm.”

[Printed, 4d. No Drawings.]

A.D. 1865, July 7.—N° 1799.

CUNNINGHAM, HENRY DUNCAN PRESTON.—“An improved method of training guns.”

Reciprocating motion is given to a gun carriage or slider by attaching it to a chain “passed over a fixed toothed or cogged barrel,” which is worked by a winch. “Multiplying toothed wheels to augment manual power” may be used.

[Printed, 1s. 8d. Drawings.]

A.D. 1865, July 7.—N° 1801.

WILSON, FISCHER ALEXANDER.—“Improvements in carriages for breech-loading ordnance.”

A carriage consisting of a platform mounted on four wheels is employed for the breech-loading ordnance described in the Specification of former Letters Patent, dated December 1, 1864, N° 2994. Underneath the platform are lockers for ammunition and spare barrels. Three guns are by preference mounted on the carriage platform. Self-acting carrying arms are used for loading the guns.

[Printed, 10d. Drawing.]

A.D. 1865, July 7.—N° 1805.

GREEN, ROBERT, and HEINKE, JOHN WILLIAM.—(*Provisional protection only.*)—“Improvements in fire-arms.”

The butt of the gun or other arm is to be made with a recess, in which is to be placed “a magneto-electric or other battery.” The electric current is to be conducted by wires to the breech of the gun and be made to fire the powder charge.

[Printed 4d. No Drawings.]

A.D. 1865, July 20.—N° 1888.

ROSSON, CHARLES.—“Improvements in portable charge holders for breech-loading guns, whether single or double barrelled, as

"also in the means of manufacturing the said holders, and in
"exploding the charge."

A case for containing the powder charge is made of steel or iron by means of dies and stamps and punches, which by repeated operations form a disc into a hollow cylinder. A flange is formed to fit the end of the barrel, and the case may be charged like a cartridge case, and be withdrawn and refilled as often as may be requisite.

[Printed, *8d.* Drawing.]

A.D. 1865, July 20.—N° 1889.

TRANTER, WILLIAM.—"Improvements in fire-arms and in
"cartridges for the same."

In the case of barrels that are "tilted" or turned down to receive the charge, "a lever, working on the bottom or side of the
"body or breech piece," and taking into "a piece fixed to the
"barrel or barrels," is employed for "fixing the barrels in their
"place." A slide, "working on the under side of the barrels," and provided with "wings or projections," is used as an extractor to draw out the spent cartridge case. In some cases the breech is closed by a sliding plunger or plug carrying a needle or striker. The cartridge is made with a strong metal base "formed to receive
"a cap placed on the end when required to be fired."

A revolver is made with chambers whose ends are closed by a breech piece, "which piece revolves on the centre rod."

[Printed, *8d.* Drawing.]

A.D. 1865, July 20.—N° 1894.

LA PENOTIÈRE, WILLIAM.—"Improvements in breech-
"loading fire-arms, and in the charges and projectiles to be used
"therewith."

The breech is closed by a breech block which is hinged at its upper front part to the barrel. In the block is carried the striker or needle actuated by a spring. The breech block is fastened when in its place by a catch or hook fixed at the side of the breech, and engaged with a stud on the breech block. A cartridge made of "metal or papier mache" is used, the base being made of "an extra strength and thickness" to resist the force of the explosion, and to receive "an inverted detonating perforated
"cap," or a hollow is formed in the base of the cartridge to

receive the detonating composition. The projectile is enclosed in "a sock of thin felt or fibrous covering," which is made to lubricate the barrel, and is detached when the projectile issues from the gun.

[Printed, 2s. 6d. Drawings.]

A.D. 1865, July 21.—N° 1908.

ROBERTON, JAMES WARREN.—(*Provisional protection only.*)
—"Improvements in the construction of needle cartridges."

A cartridge is proposed to be made with a wad placed behind the powder, in which is fixed a perforated cap. In a recess on the rear side of the wad is placed a small quantity of powder, through which the needle passes to ignite the cap. This powder is fired when the cap is ignited, and blows out both the wad and the cap at each discharge.

[Printed, 8d. Drawings.]

A.D. 1865, July 25.—N° 1926.

MAYALL, THOMAS JEFFERSON.—"Improvements in parts of
"military and other outfits."

A sheet of india-rubber or other suitable waterproof material is made to serve as a cloak or "poncho" by forming an opening in it, through which the head of the wearer is passed. At the back part are formed a pocket or haversack, and in another part one or more air bags, which may be inflated and serve as pillows. "The whole may be folded up" and be fastened by straps, and carried as a knapsack.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, July 26.—N° 1939.

SPICER, EDWARD.—(*A communication from Pedro Nisser.*)—
"Improvements in compositions similar to gunpowder for blasting, for use in ordnance and fire-arms, and for other purposes."

A composition suited "for blasting purposes" is made by combining the following ingredients in the following proportions:—Ferro or ferrocyanide of potassa, 1·50; bichromate of potassa, 2·0; perchlorate or chlorate of potassa, 10·50; nitrate of soda and potassa, 44·50; vegetable matter, 6·50; mineral and vegetable carbon, 19·50; sulphur, 15·50; making up altogether 100 parts. A more explosive powder that may be used for ordnance

and fire-arms is made by using larger proportions of the compounds of potassa, and smaller of carbon and sulphur. The salts are dissolved "by the aid of heat into a saturated solution," which is mixed with the other ingredients in a pulverized state, "and well mixed and triturated" and then dried.

[Printed, 4d. No Drawings.]

A.D. 1865, August 1.—N° 1989.

NOBLE, ANDREW.—(*Provisional protection only.*)—"Improvements in fuses for shells."

In connection with the time fuse called the "Armstrong fuse," which is ignited by a striker set free by breaking a fastening pin when the projectile is discharged from the gun it is proposed to employ a second striker, which is released by the motion of the projectile being arrested. If the time fuse should fail to act, or be "set for too long an interval," the second striker causes the bursting charge to be fired upon the projectile impinging upon the ground, or any object aimed at or hit.

[Printed, 4d. No Drawings.]

A.D. 1865, August 3.—N° 2014.

CUNNINGHAM, HENRY DUNCAN PRESTON.—"An improved method of working guns."

Chains are extended "on each side of the gun carriage and along the slide, the ends of which chains are fastened to the slide." The chains are laid over "cogged wheels," which are "attached to the carriage and turned by a crank motion. Instead of chains, ratchet or toothed wheels, and a rack or toothed bar may be used.

[Printed, 10d. Drawing.]

A.D. 1865, August 4.—N° 2027.

BONNEVILLE, HENRI ADRIEN.—(*A communication from Pierre Driron and Claude Joseph Biron.*)—(*Provisional protection only.*)—"Improvements in revolver pistols."

"An improved escapement" is proposed to be used to effect the cocking of the piece by the movement of the trigger. It is composed of "a circular plate turning on a central pivot," and having two projections, on one the trigger acts to cock the hammer, the other receives the pressure of a spring and brings

when the ends of the barrels are raised the stem of the extractor is pushed out by a lever motion and expels the spent cartridge case.

[Printed, 10d. Drawing.]

A.D. 1865, August 15.—N° 2108.

BROUN, JAMES. — (*Provisional protection only.*)—"Improvements in revolving fire-arms, in projectiles and cartridges."

The cartridge is proposed to be made with a metal core having "one or more spiral flanges upon it," and to be used in a smooth bore barrel. The requisite rotation is to be given to the projectile by means of the action of the gases of explosion on the spiral flanges of the cartridge.

Lubricating matter is to be placed in cavities formed in the projectile and in recesses upon its periphery. In the case of revolver fire-arms, the charge is to be pushed forward from each charge chamber, as each successively is brought up to the barrel by a self-acting bolt, and the charge is to be fired in the barrel.

[Printed, 4d. No Drawings.]

A.D. 1865, August 19.—N° 2151.

SOPER, WILLIAM.—"Improvements in breech-loading fire-arms."

The breech is closed by a wedge shaped breech block made to work in a slot formed behind the breech end of the barrel. The block is worked by a lever motion below the barrel, and is depressed to allow the cartridge to be pushed directly into the rear end of the barrel. A pin striker is used and the lock is made to work below the barrel. By depressing the lever the wedge-shaped block is depressed, and a "sliding extractor" is made to push out the spent cartridge case.

[Printed, 10d. Drawing.]

A.D. 1865, August 28.—N° 2210.

POLAIN, PROSPER.—"Improvements in breech-loading revolvers."

The revolving cylinder is "provided with a number of chambers in which are enclosed a corresponding number of short chambers or barrels" to receive cartridges. The barrels are screwed

" at their outward ends into holes in a circular plate or disc, which is common to them all," and which may be "slidden forward or backward on a central pin or axis." Openings are made "in the sides of this cylinder for the purpose of introducing the cartridges into the charge chambers," which are moved forward so that they may be inserted at their rear ends. When the barrels are charged "they are drawn back, and the edges of their open ends enter circular grooves made in the end plate of the enveloping cylinder, and thus the breeches are rendered close." By drawing back the cylinder the charge chambers are opened.

[Printed, 8d. Drawing.]

A.D. 1865, September 2.—N° 2266.

REICHEN, CONSTANT.—"Improvements in preparing charges for fire-arms and for blasting."

Charges for blasting purposes are formed by impregnating "paper or vegetable fibres in the form of sheets" with a composition composed of chlorate of potash, 9 parts; nitrate of potash, $4\frac{1}{2}$ parts; prussiate of potash, $3\frac{1}{4}$ parts; charcoal powder, $3\frac{1}{4}$ parts; starch, $\frac{3}{16}$ parts; chromate of potash, $\frac{1}{16}$ parts; water, 79 parts. The water is boiled and the ingredients are dissolved in it. The fibres or sheets are steeped in the solution and dried. The charges are made waterproof by enveloping them in paper saturated "with a solution of xyloidin in acetic acid."

[Printed, 4d. No Drawings.]

A.D. 1865, September 5.—N° 2275.

SNIDER, JACOB, junior.—"Improvements in the construction of fire-arms, such improvements being also applicable to the alteration and adaptation of parts of existing fire-arms."

A new barrel is connected "with a shoe, which shoe forms the breech, and holds, carries, or comprises the breech-loading gear or apparatus in such a manner that the barrel and shoe when combined will exactly fit into the hollow or bed of the stock which previously received the muzzle-loading barrel" before used in the same stock; or a stock intended to receive the muzzle-loading barrel of the old pattern is fitted with "the shoe," into which is screwed the barrel of the new pattern, which may have a bore of reduced diameter. The construction of the shoe is not

described, "as the same will be understood by persons acquainted
"with such-like mechanism."

[Printed, 4d. No Drawings.]

A.D. 1865, September 8.—N^o 2306. (* *)

WALKER, JOHN.—(*Provisional protection only.*)—"Improvements in mounting and working guns in ships, forts, and batteries."

"I first mount the gun slide upon which the gun carriage is supported upon a shaft free to revolve in a socket or tube carried through the deck or floor, and free to move in an elongated slot, the inner face of which is circular at both ends. For greater strength the shaft is furnished at the top with a collar, and for the ready training of the gun I fit friction rollers near the shaft and under the slide. In order to retain the gun when trained I either use blocks or I apply a worm wheel on the head of the shaft. The worm may be used not only to retain the gun in the required position, but the gun may also be trained by it. After firing the gun may be turned round for loading.

"In order to work guns in pairs, and to communicate an up and down motion to them, to allow of one gun being raised for firing while the other is lowered and protected to be loaded, I support the bottom of my pipe or socket on a bed plate attached by chains to a drum on or forming part of a horizontal shaft, and on one side of that shaft, and I connect a platform to the top of the socket. I cut away or leave a space in the deck or floor to receive the platform. I make similar arrangements, and connect another pipe or socket on the opposite side of the same horizontal shaft. Round the apertures in the deck or floor I erect a short screen which, when the guns are in position for firing, comes below the level of the mouth thereof.

"One gun and apparatus balances the other, and supposing them to be fitted amidship, in, for instance, a gun boat, the guns may be made to sweep the horizon. Now suppose the slides with their vertical shafts fitted in the sockets, and the guns and carriages on the slides. One gun will be up above the deck ready for firing and the other will be below the deck, being loaded, in which act the gunners will be fully protected. The deck gun fired, rotation is imparted to the horizontal shaft, when that gun descends and the loaded gun is raised for firing,

“ and so on. Should two guns not be required, then a weight to balance one gun and apparatus must be connected to the opposite side of the horizontal shaft. For the midship guns the sockets are not free to move in a slot as is the case for port-hole and embrasure guns.

“ Instead of running guns out for firing, I simply bring the muzzles up to or near the port holes or embrasures, and to protect them and to carry off the smoke consequent on the discharge, I place a tube on the outside of the gun and run it out when the gun is ready for being fired by sliding it along the gun. In constructing new guns I flute the outside of the barrel, but for guns already constructed I place longitudinal ribs on the inside of the tube; thus recesses are formed through which the air is drawn and the place of discharge ventilated on the firing of the gun.”

[Printed, 4d. No Drawings.]

A.D. 1865, September 13.—N^o 2345.

PRINCE, FREDERIC WALLER.—“ Improvements in breech-loading fire-arms and cartridges.”

The breech of the barrel is closed by means of a “plunger with lugs forming the segment of a screw.” The plunger which slides in a chamber in the rear of the barrel is “hollowed, and has a conical fore end in which works a needle and striker” for discharging cartridges which contain their own ignition. A tube is attached to the rear of the projectile in which is formed a recess. The rear part of the tube is filled with slow burning fuse composition, and the recess is filled with fine powder so that the projectile may act as a shell. The fuse composition may be ignited by means of a percussion patch, or by the explosion of the propelling charge of gunpowder.

[Printed, 8d. Drawing.]

A.D. 1865, September 14.—N^o 2351.

HARDING, GUSTAVUS PALMER.—“ Improvements in the manufacture of tubes for gun barrels and other purposes, parts of which improvements are also applicable to the manufacture of rods or bars, and to the rifling of ordnance and fire-arms.”

Tubes for gun barrels are made by forcing them through dies composed of segmental dies or rollers, having tapered or other

"shaped grooves formed on their peripheries." The tubes are drawn upon mandrils through the dies by hydraulic apparatus. Rifling grooves are formed inside the tubes by employing "a mandril having a bulb thereon on which are formed either indentations or projections."

[Printed, 1s. Drawing.]

A.D. 1865, September 14.—N° 2354.

ELLIS, WILMOT BURROWS EDWARD.—(*Provisional protection only*).—"An improved form of rifling for fire-arms and ordnance."

A rifled bore is proposed to be made of such a figure in section that it "will comprise five arcs of equal size and five straight lines of equal length, and the construction of the figure is to be such that a circle inscribed in it will have the proper diameter, that is, the rifle will be of the calibre required."

[Printed, 4d. No Drawings.]

A.D. 1865, September 18.—N° 2381.

NEWTON, ALFRED VINCENT.—(*A communication from Orazio Lugo*).—"An improved construction of projectile."

A small charge of powder is placed in front of the projectile and is fired by means of a string or cord introduced from the muzzle of the gun, so that the air in front of the projectile is blown forward. In the rear of the projectile are placed consecutive charges, some consisting of slowly, others of quickly burning gunpowder. These are ignited one after the other in succession so as to start the projectile with slow velocity and gradually increase it.

[Printed, 8d. Drawing.]

A.D. 1865, September 23.—N° 2438.

NEWTON, WILLIAM EDWARD.—(*A communication from Hiram Berdan*).—"Improvements in breech-loading fire-arms, and in cartridges to be used therewith."

When flanged metallic cartridges are employed in a breech-loading gun, "a presser" is adapted "to act upon the front of the flange of the cartridge so as to draw it back against the breech before firing. This presser may form part of the cartridge shell retractor, or of a piece applied especially for the purpose," it is made of hardened steel. The breech is closed

by "a swinging breech-piece" and the cartridges are ignited by means of a pin striker. "Two or more balls of different degrees " of hardness" are placed in a cartridge, "each one being of a " harder metal or alloy than the one in front of it, the object " being to discharge" the balls " in a volley."

[Printed, 1s. Drawing.]

A.D. 1865, September 25.—N° 2452.

PRINCE, ALEXANDER.—(*A communication from Samuel Norris.*)—"Improvements in breech-loading fire-arms."

The breech is closed by a hinged breech block "jointed to the " top of the barrel by means of a pin and socket piece, in such a " manner that it can be raised out of and lowered into the cavity " of the breech." The block is secured "at the rear end by " means of a cam actuated by a short lever at the side of the " block." Attached to the block is a rack and pinion motion working a slide extractor for withdrawing the spent metallic cartridge case. The hammer is so arranged that it cannot strike the "discharging pin" when the breech block is not properly in its place.

[Printed, 8d. Drawing.]

A.D. 1865, September 26.—N° 2466.

NEWTON WILLIAM EDWARD.—(*A communication from Anthony Arthur Voruz.*)—"Improvements in fire-arms and ordnance."

A number of holes "pierced through the barrel" of the gun, and "surrounded by an envelope placed concentrically" allow the gases of explosion to escape from the gun. The object is to "augment the accuracy of the flight of the projectile," and also to diminish the recoil.

[Printed, 8d. Drawing.]

A.D. 1865, September 27.—N° 2475.

BROUN, JAMES.—(*Provisional protection only.*)—"Improvements in cartridges."

The case of the cartridge is to be made of "paper or cloth of " cotton or other vegetable fibre" which has been converted by the action of acids into pyroxylin or gun cotton. The cartridge

A.D. 1865, October 6.—N° 2569.

RENDEL, GEORGE WIGHTWICK.—“Improvements in the construction of gun carriages.”

The improvements relate to self-acting “compressor” apparatus, which can be worked by hand when required. The apparatus remains in action, “when once thrown on, until it is released by the gunner, so that, to the extent of its power, it holds the gun in any position on the slide or directing bar securely, so long as desired, for instance during loading.” The compressor may be made by attaching a “series of short blades” to the carriage, “interspaced with plates, which run the length of the fixed slide, and are attached to it.” The compression of the plates, which gives the required friction, so as to stop the recoil and hold the gun, is effected by the action of a lever acting on a screw spindle or eccentric. The lever has a projecting end, which comes in contact with a tappet, turning on a stud upon the slide in one direction, being prevented from turning in the opposite direction by a stop on the under part of the slide. When the carriage recoils, the end of the lever comes against the tappet, which is arrested by the stop, the lever is thereby forced to make a partial revolution, and turns the screw spindle, and tightens the compressor. When the gun is running out, the tappet allows the end of the lever to pass freely. The tightening may also be effected by moving the lever by hand.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, October 12.—N° 2628.

SELWYN, JASPER HENRY.—“Improvements in cartridges for certain kinds of breech-loading fire-arms.”

The cartridge cases are made by preference of sheet metal, and are formed of “a conical or spheroido-conical figure.” They are discharged by a striker, acting upon a cap in the ordinary way. The cartridges are more particularly intended for being used in a breech-loader, constructed on the “Mont Storm” principle, with a charge chamber hinged to the barrel. At the rear end of the barrel is an annular recess, into which the end of the cartridge case is forced by the explosion, so as to make a tight joint; the edge of the case is also held by the recess, so that when the charge chamber is raised the spent cartridge case is partially extracted. In some cases an annular projection may be formed on the end

of the cartridge case,, which is forced into a recess formed in the rear end of the barrel.

[Printed, 8d. Drawing.]

A.D. 1865, October 12.—N° 2633.

WILLIAMS, HENRY HEADLY.—(*Provisional protection only.*)—“Improvements in sabots for projectiles.”

The sabot is proposed to be made with a projection in the front to fit in the recess in the rear of the projectile. In some cases, the sabot is to be made with a tail piece, containing the igniting composition, and extending back into the powder charge.

[Printed, 4d. No Drawings.]

A.D. 1865, October 13.—N° 2645.

WILLIAMS, HENRY HEADLY.—(*Partly a communication from Albert Rohde.*)—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms.”

The breech is to be closed by a sliding bolt fastened by lugs, which are locked by turning the bolt; the same motion sets the gun at half-cock. The needle works in a hollow plunger, packed “with copper or other soft metal,” whereby the needle is cleaned after every discharge.

[Printed, 4d. No Drawings.]

A.D. 1865, October 13.—N° 2650.

NEWTON, WILLIAM EDWARD.—(*A communication from George Richard Willmot.*)—“Improvements in tompons for ordnance and small arms, and in stoppers for bottles and other vessels.”

The tompon or stopper for guns is made of vulcanized india-rubber, which is covered with cloth or other material, to prevent the sulphur in the vulcanized material from acting injuriously upon the gun. When the tompon is inserted in the muzzle of the piece, the packing is expanded by turning a spindle, which works a screw, and draws the packing in the direction of the axis of the screw, and causes it to bulge “circumferentially.”

[Printed, 8d. Drawing.]

A.D. 1865, October 20.—N° 2709.

NEEDHAM, JOSEPH, and NEEDHAM, GEORGE HENRY.—“Improvements in central-fire breech-loading fire-arms, and in ammunition for the same.”

The breech of the breech-loading barrel is closed, by means of "a square block-like piece, comprising the gun lock, trigger, and guard, all mounted on a fulcrum pin, situated immediately below the breech end of the barrel."

The breech piece contains the striker, and fits between side pieces let into the stock, and is depressed by means of a lever handle, to allow the charge to be inserted into the barrel, it is then raised and fastened in its place, closing the breech during discharge. The spent cartridge is extracted by causing a projection on the base of the cartridge to enter and become attached to a notch cut in the face of the block piece, or teeth attached to the block piece may be made to operate as an extractor, or a sliding piece with a projecting arm or finger may be used.

In some cases, the block piece may be made to move on a joint "above the barrel, instead of below."

In the case of barrels that are "tilted," or turned down to receive the charge in the breech, a stem having a projection is mounted on the under side of the barrel, in such a way that as the barrels are turned down the projection on the stem pushes out the base of the spent cartridge case." "A detached sliding "striker" is used to fire self-igniting cartridges, it is operated by "a cam on the axis of the lever used to secure and release the "barrels," which by its motion sets the striker at half-cock.

The bullet for central-fire guns may be made of iron tinned, and have a recess in it for containing the powder charge, or a powder chamber formed of thin metal may be attached to the rear of the iron bullet.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, October 24.—N^o 2743.

GREY, FREDERICK HARGRAVE. — "Improvements in the construction of gun locks for the discharging central-fire cartridges, as used in breech-loading fire-arms."

An arm on the tumbler of the lock is made to strike "a sliding piston or plunger fitted into the lock plate," whose front propels a "cap striker which works through the base of the breech piece." The sliding piston or plunger may be connected with the tumbler by a swivel or stud.

[Printed, 8d. Drawings.]

The breech is closed by a hinged block attached, at its front part, by a hinge to the rear end of the barrel, and fastened by a "lever latch." A slight motion of the lever releases the latch and raises the breech block, exposing the rear end of the barrel. A sliding extractor is worked by a rack and pinion action, connected with the block that when it is raised the spent cartridge case is pushed out. The extractor is afterwards drawn back by the action of a spring. The striker, which is made to work with a spring in the breech block, is held fast, so that it will not act except when the block is down in its place and fastened by its latch, which at the same time releases the striker."

[Printed, 10d. Drawings.]

A.D. 1865, October 30.—N° 2795.

DEAKIN, WILLIAM, and JOHNSON, JOHN BAGNALL.—
"Improvements in the manufacture of ordnance, whole or in parts."

The improvements are based upon those described in the Specifications of prior Letters Patent, dated respectively April 23, 1863, (N° 1023 and N° 1024), January 19, 1864 (N° 139), November 9, 1864 (N° 2784), May 15, 1865 (N° 1341).

Tubes for guns are made by "wholly or partially perforating" a block of metal of the requisite size, "termed a mould," and heating it in a furnace, and hammering it upon a mandril to make it approximately of the requisite size. The tube is then passed through "suitably grooved rollers in succession," so as to elongate it and make it of such a shape and size that when turned and bored it is suited for being made into a finished gun. The mandril used has an adjustable stem, and is made hollow, so that a stream of water may be passed through it to keep it cool. A reversing motion may be given to the rolls, so as to pass the tube required to be rolled backwards and forwards through the rolls. The tubes or cylinders may be made into guns by placing rings or tubes upon them in the usual way.

[Printed, 1s. Drawing.]

A.D. 1865, October 31.—N° 2800.

CHATTAWAY, CHARLES.—(*A communication from Emile Della-Noce.*)—(*Provisional protection only.*)—"Improvements in fire-arms."

A tubular magazine is proposed to be attached to the side of the barrel, in which are placed percussion caps. The caps are to

be moved by a slide motion, so as to place them on the nipple. The breech of a breech-loading gun is to be closed by a sliding plug, which works in a chamber behind the barrel. The fore end of the sliding plug is provided with a collar that fits in a recess in the rear of the barrel. In the front of the collar is fixed "a disc of vulcanized india-rubber," so as to make a tight joint. Gun locks may be made with a single bent spring, one limb or arm of which "acts on the tumbler which is on the axis of the hammer," and the end of the other limb acts on the sear of the lock, and "takes into the notches or beats of the tumbler."

[Printed, 4d. No Drawings.]

A.D. 1865, November 2.—N^o 2831.

HENWOOD, CHARLES FREDERIC.—(*Provisional protection only.*)—"Improvements in projectiles."

Projectiles intended to be fired from smooth bore guns are proposed to be made with grooves on their peripheries, the grooves being made broader and deeper at the rear and tapering to the front of the projectiles. The action of the air upon the grooves gives rotatory motion to the projectile.

[Printed, 4d. No Drawings.]

A.D. 1865, November 4.—N^o 2856.

WHITWORTH, JOSEPH.—"Improvements in preparing the ammunition or charges for rifled ordnance and rifled fire-arms."

One or more "discs of metal of the exact figure or shape of the section of the rifle bore" are attached, in the case of ammunition for ordnance, to "the forward end of the powder bag, in the case of small arms, to the base of the bullet. The disc scrapes the inside of the barrel and removes fouling deposits. When two or more discs are used they are made slightly different in size, and "a thin film of wax" is interposed between the discs, which is pressed out when the charge is pushed home, and is so made to lubricate the barrel. When "gun cotton is used the disc protects the base of the bullet from injury."

[Printed, 8d. Drawing.]

A.D. 1865, November 7.—N^o 2869.

NEWTON, WILLIAM EDWARD.—(*A communication from John Ericsson.*)—"Improvements in apparatus for working, pointing, and checking the recoil of cannon or ordnance."

"A rotatory compressor, composed of a series of metallic discs," is secured to "an axle which passes through the side frames of the gun carriage." Pinions on the axle "work into toothed racks bolted to the inside of the gun slides." Wooden discs, inserted between the metallic discs, are "fixed within a cylindrical box, made of iron or brass," and having on its circumference coggs, into which gears a pinion "which, by means of suitable hand gear, enables the gunner to run the gun in and out." By means of the hand gear the box "may be instantly locked, and the movement of the gun carriage checked." The training of the gun is "effected by means of a toothed rack attached to the slides on which the gun carriage moves." The rack is worked by a pinion attached to a vertical shaft.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, November 11.—N° 2902.

JONES, CHARLES WILLIAM.—"Improvements in fire-arms and projectiles."

The butt of the stock is "twice cut, first longitudinally through the upper part of the cheek piece from the heel to the waist or grip, and transversely," so that the parts being hinged will allow the marksman to adjust the stock as required for various distances. The barrel is rifled "ratchet-wise, but in the reverse direction to that which is usually employed." The projectiles are made of a corresponding form.

[Printed, 1s. 4d. Drawings.]

A.D. 1865, November 11.—N° 2906.

MILLAR, JOHN.—"Improvements in cartridges."

In the cartridge case is inserted a disc or wad, upon the surface of which "chlorate of potash and emery powder or charcoal" are made to adhere, or the base of the cartridge is coated with those same materials. Above this disc is inserted another disc, having on its inner face "notches or perforations and a slight recess, which is "nearly filled with varnish," mixed "with amorphous phosphorous, alone or combined with sulphuret of antimony or emery, or both." When the charged faces of the two discs are forced into close contact by a striker explosion takes place, which ignites the powder charge of the cartridge.

[Printed, 8d. Drawing.]

A.D. 1865, November 17.—N° 2958.

COOPER, JOSEPH ROCK.—“Improvements in breech-loading fire-arms.”

A charge chamber open at both ends is “hinged or jointed to the open breech end of the barrel, and turns either in a vertical or horizontal plane. When shut down in the position proper for firing the said charge chamber fits in a rectangular frame fixed to the breech end of the barrel.” The rear end of the chamber is closed by a screw breech, in which works a pin striker actuated by a spring. The chamber is raised by a lever, connected with which is “a fixed rod or projection,” which is made to enter the charge chamber and push out the spent cartridge case. The cartridge case is made to project slightly beyond the front of the charge chamber, so that it enters the rear end of the barrel and covers the joint and makes it gas tight. In some cases the rear end of the chamber may be closed by a wedge block instead of a screw.

[Printed, 1s. 10d. Drawings.]

A.D. 1865, November 20.—N° 2976.

HEATHORN, THOMAS BRIDGES, and WELLS, JOSEPH HENRY GEORGE.—“Improvements in gun carriages.”

The gun is mounted “with or without trunnions,” the trunnions or “their equivalents” being made to work in slots which are “the arcs of circles” struck from the muzzle of the gun as centre, or from that part of the gun upon which it is required to be pivotted. The trunnions are made to rise and fall by the action of levers attached to a cross bar which is moved by toothed segments worked by racks acted upon by hydraulic rams. In some cases screws or differential pullies may be used for working the gun.

[Printed, 1s. 6d. Drawings.]

A.D. 1865, November 20.—N° 2981.

WITNEY, CHARLES.—“Improvements in breech-loading guns and in cartridges for breech-loading guns.”

The breech is closed by a sliding breech piece, in which works a spring striker. The breech piece is moved by a “lever of a curved shape;” the cartridge is introduced through an opening made in the top of the barrel. The cartridge used contains its

own means of ignition, consisting of a cap or patch, which is placed in a recess of the projectile and is ignited by a needle which passes through the powder charge, so that it is fired at its forward end.

[Printed, 10*d*. Drawing.]

A.D. 1865, November 23.—N° 3013.

LAMSON, EBENEZER GOODNOW.—(*A communication from Albert Ball.*)—"Certain new and useful improvements in breech-loading and repeating fire-arms."

A tubular magazine for holding and supplying cartridges is fixed below the barrel of the piece. The cartridges are successively pushed up by the action of a spring and are received by a carrier piece actuated by a lever connected with the trigger guard. The cartridge is raised by the carrier piece level with the breech end of the barrel into which it is then pushed. The carrier piece is also made to act as an extractor for removing the spent cartridge cases. Various modifications of the principle of construction are described.

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1865, November 24.—N° 3021.

MALLET, ROBERT.—"Improvements in mounting ordnance."

The trunnions of the gun are supported in moveable bearings so arranged that the gun will swivel upon the muzzle, and may be fired in various directions through a port or embrasure of small dimensions. The bearings are formed of "metal blocks, which are free to move up and down between guiding cheeks in each side of the carriage," the blocks are raised by means of two hydraulic rams. "Concentric with the trunnions on each side of the gun there is fitted in any convenient manner a circular disc or segment of a circle" or other curve; to the upper part of each segment is secured "one end of a chain which is wrapped round the segment, the other end being secured to the lower part of the gun carriage," the preponderance of the rear part of the gun will keep the chains taut. "On elevating the trunnion slide blocks by the action of the hydraulic rams, the consequent strain or pull upon the chains, by acting upon the segments above referred to, will tend to turn the gun upon its trunnions in a vertical plane, and this rotatory action is so regulated that,

"combined with the lifting of the gun parallel to itself, it shall maintain the axis of the gun at the muzzle at the same level, whatever may be the position of the trunnions of the gun within its limits of elevation or depression." Other arrangements of segments and chains and links may be used, and also "elevating screws or other equivalent mechanism."

[Printed, 1s. Drawing.]

A.D. 1865, December 1.—N° 3082.

PRINGLE, WILLIAM.—"Certain improvements in breech-loading fire-arms."

A breech piece is "attached or permanently fixed to the barrel having a parallel hole in which a breech block is made to work vertically by means of side levers fixed inside and outside of the said breech piece." The outside lever lowers the breech block, and moves "a bar or slide fixed to the same side." On one end of the bar is a projection that acts as an extractor for removing the spent cartridge case. The other end of the bar is caused "to come in contact with a pin or other projection on one side of the hammer," which is thereby raised, "so that by one action the breech block is lowered, the cartridge case withdrawn, and the hammer raised." The hammer on falling forces forward a bolt striker. A hollow lengthening piece is attached to the ramrod, which may be unscrewed and inverted and again screwed on to the rod without adding to its length in the inverted position.

[Printed, 10d. Drawing.]

A.D. 1865, December 4.—N° 3113.

HODGES, EDWIN CHARLES.—"Improvements in the construction of breech-loading fire-arms."

The barrels are tilted or turned down to receive the charge in their rear ends. A bolt striker is made to work "in a recess in the recoil shield," and through a hole in the breech plate, so that it may strike the base of the cartridge centrally. Behind the bolt striker is a lever, the end of whose upper arm is inclined or bevelled, and when it is struck by the bevelled nose of the hammer the lower arm of the lever drives forward the bolt striker. In some cases the head of the bolt striker is rounded and is struck by the bevelled end of another bolt fixed on an angle to it, the latter bolt being acted upon by the hammer. Below the barrels is a

sliding piece having prongs upon it to enable it to extract the spent cartridge case. When the barrels are turned down "inclined" "grooves in the breech piece" act upon lateral projections upon the sliding extractor, and cause it to push out the spent cartridge cases.

[Printed, 8d. Drawing.]

A.D. 1865, December 7.—N° 3151.

NORRIS, SAMUEL.—(*A communication from Philo Remington, Samuel Remington, and Eliphalet Remington.*)—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

In order to prevent the piece from being accidentally discharged an indentation or recess is to be made in the back of the hammer. A safety bolt is then made to engage in the recess in the hammer, and the piece can only be fired when it is properly drawn back.

[Printed, 4d. No Drawings.]

A.D. 1865, December 8.—N° 3154. (* *)

HOLMES, NATHANIEL JOHN.—(*Partly a communication from Matthew Fontaine Maury.*)—"Improvements in the applications of electricity for the testing and discharge of torpedo mines either on land or at sea, and in the apparatus connected therewith."

1st. Testing the effective condition of the torpedo and of its connections without risk of explosion. The fuse is cut out of the circuit by a "bridge" of fine platinum wire through which the intense testing current easily passes but which is impassible by the "igniting or accumulated current." In the Final Specification it is stated that to ensure that the "bridge" shall be the only path for the passage of the testing current, "a gulf or broken circuit" (that does not impede the passage of the igniting current) is "interposed between the fuse and the bridge connection."

2nd. Telegraphing by "tension" currents sufficiently powerful to explode the mine were the "short circuit conductor removed from the fuse."

3rd. Exploding the torpedo or torpedoes at will by "accumulated currents" only, "tension" currents alone being used to test or telegraph.

4th. Exploding the torpedo only when the vessel is "within the area of its destruction," and not otherwise. The electric

current is either completed or broken " for the transmission of the " accumulated charge " when the enemy either enters or leaves the area of destruction, the locality of the said area being ascertained by cross bearings, and the concurrence of two operators being necessary for the explosion.

5th. When a torpedo cannot explode with effect from the bottom of the water, bringing it into a suitable position " when " the enemy makes his appearance." The buoyant torpedo is attached by a rope to a fixed shell, so as to float at the proper depth ; on the ignition of the fuse in the shell the said shell bursts and the torpedo " floats up to its normal position ready for ignition." The fuse of the shell is ignited by an electric current.

6th. When the current is strong using the velocity of the stream " as a motive power for raising the torpedo."

7th. Insulating the electric circuits and fuse arrangements within the torpedo "from the torpedo case and charge." This is facilitated by the parts of the torpedo, which are " constructed and " combined upon an ascertained and well defined principle."

8th. Preventing the explosion of the torpedo by the enemy even if he has got hold of one end of the metallic conductor. A metallic wire is employed for the return circuit, and " the circuits at the " firing and speaking stations " are always kept " broken or open " circuits," which can only be closed by the operator at his range with the concurrence of another operator or observer.

Several torpedoes may be simultaneously tested, telegraphed through, and discharged by means of this invention.

Intelligence of the breakage of the conducting wires by the enemy may be given to the observers by continuously passing " tension " currents " through the wires in connection with alarm " bells, contrived to ring only when the current is interrupted, " and so give notice of any successful attempt to destroy the " circuits."

[Printed 6d. No Drawings.]

A.D. 1865, December 8.—N° 3155.

CLARIDGE, THOMAS.—(*Provisional protection only.*)—" Improvements in machinery for rolling gun barrels and other " articles."

Rolls for rolling gun barrels are proposed to be so arranged that their motion is arrested " for a brief period of time at every

"revolution," so as to make it "easy to put the breech of the barrel in its proper place between the rolls," and enable the lump to be properly formed upon it. The object is to be effected by employing a sliding clutch, which is thrown in and out of gear.

[Printed, 4d. No Drawings.]

A.D. 1865, December 8.—N° 3163.

PARKES, ALEXANDER.—"Improvements in preparing compounds of xyloidine or gun cotton, and in the apparatus employed."

Instead of drying the converted substances before they are dissolved, which is a dangerous process, they are removed from the "acids or changing agents," and then pressed in a hydraulic press, and then washed and partially dried in "a centrifugal machine." When the converted materials do not "contain more than from 5 to 10 per cent. of water," they are dry enough for being dissolved in naphtha or other solvent.

[Printed, 1s. Drawings.]

A.D. 1865, December 9.—N° 3178.

WILSON, THOMAS.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

The breech is proposed to be closed by a "plug having a sliding motion as well as a motion of partial rotation," the plug being made to slide in a chamber in the rear of the barrel.

Or a "metal shoe" or tube, of a slightly greater diameter than the barrel is attached to the rear end of the barrel, and the breech is to be closed by a hinged breech block, in connexion with which a sliding extractor is made to work. Cartridges that contain their own ignition are made with a percussion cap containing a tubular anvil or an anvil formed of sheet metal bent somewhat in the form of the letter N in cross section.

[Printed, 4d. No Drawings.]

A.D. 1865, December 9.—N° 3181.

ELEY, WILLIAM THOMAS.—(*Provisional protection only.*)—"Improvements in central fire breech-loading cartridges."

Cartridges that contain their own ignition are proposed to be made impervious to damp and gas tight, by "filling up the interstices between the cap and the inner walls of the chamber in which it is placed, with melted wax, india-rubber, or varnish, or other cement capable of resisting damp or moisture."

[Printed, 4d. No Drawings.]

A.D. 1865, December 11.—N° 3197.

MURPHY, WILLIAM JEREMIAH.—"An improved method of and apparatus for the working of breech-loading guns."

The gun is fitted "with a cylinder at the breech," which forms "part of the gun itself." Inside the cylinder a "solid piston or plunger is made to work up and down by hydraulic pressure." A chamber is formed "between the cylinder and the gun" for receiving the charge. "When the plunger works up it will force the charge into the barrel and remain tight there until the shot is fired off." The cocks are then opened and the piston retires. The gun may be turned on a turntable and be raised or depressed by self-acting hydraulic apparatus.

[Printed, 10d. Drawing.]

A.D. 1865, December 12.—N° 3206.

BUDENBERG, ARNOLD.—(*A communication from Bernhard August Schöffler and Christian Friedrich Budenberg.*)—"An improved blasting powder."

The composition is made by mixing "4 parts of potassio tart-rate of soda, 78 parts of nitrate of potash, 8 parts of sulphur, and 10 parts of wood charcoal." The matters being "mixed together or granulated may be used in cartridges."

[Printed, 4d. No Drawings.]

A.D. 1865, December 15.—N° 3249.

ASTON, JAMES.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, and in ammunition for the same."

The breech of the barrel is to be closed by a breech block, which is hinged to the forward part of a recess in which it fits. A spring striker is to be made to work in the breech block.

A cartridge containing its own ignition is proposed to be made with a wad to form its base. In the centre of the wad is placed

a cup which contains the percussion cap or patch. At every discharge the wad left behind by the former charge is blown out of the barrel.

[Printed, 4d. No Drawings.]

A.D. 1865, December 16.—No 3258.

NEWTON, ALFRED VINCENT.—(*A communication from Silas Crispin.*)—"Improvements in breech-loading fire-arms and "rotating breech cylinder pistols, and cartridges to be used "therewith."

The charge chamber is formed partly in the rear end of the barrel, and partly in a breech piece fixed in the stock, which is hinged to the bottom part of the barrel. The end of the chamber in the barrel, and the face of the chamber in the breech piece are made with a chamfer, and on the outside of the metallic cartridge employed is an annular projection corresponding with the annular recess formed by the chamfered parts above mentioned. A gas-tight joint is thereby formed, and the cartridge is readily extracted. A similar construction is applied to revolving fire-arms. The cartridge case may be made of a seamless piece of metal, or a sheet of metal coiled upon itself.

[Printed, 10d. Drawing.]

A.D. 1865, December 19.—No 3275.

M'EVOY, CHARLES AMBROSE.—"Improvements in igniting "shells and similar projectiles."

A small bottle of glass filled with "sulphuric acid or other corrosive liquid" is enclosed in a case made of a zinc or other metal that can be corroded by the acid. The charged bottle and case are inserted in the fuse of a shell, in which is placed a "composition of chlorate of potash and sugar" in such a manner that when the shell is fired the bottle is broken by the concussion "or by the action of a striker. The acid then acts on the metal and eats it away in a given time, and then ignites the chlorate of potash composition and fires the bursting charge of the shell. "The explosion may in this way be produced at any desired "interval varying from a few minutes to many days."

[Printed, 6d. Drawing.]

A.D. 1865, December 19.—N^o 3278.

DANA, EDWARD AUGUSTUS.—“An improved projectile for
“rifled cannon or ordnance.”

A sabot made of soft metal and of a cylindrical or annular shape is attached to the rear of the projectile, which is made of smaller diameter than the fore part. The sabot has ribs formed on its internal surface, which fit in grooves formed on the rear part of the projectile, so that when the sabot is driven forward by the force of the explosion it becomes firmly attached to the projectile. The rear face of the sabot is made flat or cup-shaped to facilitate the expansion of the metal so as to fill the rifling grooves.

[Printed, 8d. Drawing.]

A.D. 1865, December 19.—N^o 3284.

CLARK, WILLIAM.—(*A communication from Oliver Fisher Winchester*).—“Improvements in repeating fire-arms.”

The improvements are based upon those described in the Specification of former Letters Patent, dated May 15, 1863, N^o 1223. A self feeding tubular magazine for holding and feeding cartridges is fixed below the barrel of the piece. As the cartridges are pushed up by a spring, they are received by a carrier, worked by a lever motion by means of the trigger guard, and are raised level with and pushed into the breech end of the barrel which is closed by a breech block. Attached to the carrier is an extractor for withdrawing the spent cartridge case. When required the cartridge may be inserted in the barrel by hand or the piece may be loaded from the muzzle. An adjustable sear is used “so that
“the arm may be discharged by a light or heavier pull upon the
“trigger.” The sear and trigger are “both formed of one
“and the same piece” by forming an arm on the trigger through which a screw passes into the frame, a slot in the arm allows it to be adjusted as required.

[Printed, 2s. 8d. Drawings.]

A.D. 1865, December 20.—N^o 3289.

RICKETT, THOMAS.—“Improvements in the manufacture of
“metal tubes for gun barrels and other purposes, and in machinery
“or apparatus employed therein.”

Barrels for guns are made by rolling tubes upon mandrils. The mandril is "fixed at one end, and on the other end is a bulb " or enlargement." The enlarged head of the mandril "is placed " in the centre of the space formed by the juncture" of four rollers, which are mounted "on shafts enclosed in a strong metal " frame." The stem of the mandril is supported "whilst the " tube is being rolled in the one direction, by means of plates," connected by chains, and travelling on guide bars. While the tube is being rolled in a direction from the head to the stem of the mandril the plates are pushed before the tube, when it is rolled in the opposite direction the plates are drawn after it by weights attached to chains. The rollers may be worked with reversing motions.

[Printed, 1s. 2d. Drawings.]

A.D. 1865, December 21.—No 3304.

NEWTON, WILLIAM EDWARD.—(*A communication from Caleb Huse.*)—"Improvements in cartridges for breech-loading fire-arms."

The cartridge case is made of thin sheet metal, the base being flanged. The fulminate composition is "placed in a hole made in " a circular piece of cardboard," and is fitted against the base of the cartridge, which being made of thin sheet metal yields easily to a blow. Over the fulminate is placed "a steel or other metal " disc with a small hole in the centre," against which the base is driven by a blow from the striker, so that it acts as an anvil to cause the discharge. The powder is filled in the case above the metal disc, and "the bullet when placed thereon is soldered in its " place."

[Printed, 6d. Drawing.]

A.D. 1865, December 26.—No 3337.

REEVES, CHARLES.—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

The breech of the barrel is closed by a hinged breech block. A spring striker is placed in the breech block having its rear end bevelled or inclined, the nose of the hammer is similarly bevelled or inclined, and when the hammer falls, the action of the inclines causes the striker to be projected forwards against the end of the cartridge, and fires the ignition patch or cap. In some cases a lever is interposed between the hammer and the striker in

such a manner that the inclined end of the hammer strikes the long arm of the lever, and forces the short arm against the striker, and propels it forward. In some cases the striker may be "actuated by means of a wedge on a horizontal rod." A self-igniting cartridge is made with "an annular metallic trough or depression" in the base, in which is placed the percussion composition which is covered with a perforated disc. The cartridge is made slightly conical and the rear end of the barrel is made "trumpet-shaped" to facilitate the extraction of the cartridge.

[Printed, 1s. 8d. Drawings.]

A.D. 1865, December 27.—N^o 3348.

DODGE, WILLIAM CASTLE.—"Improvements in breech-loading fire-arms, and in cartridges for the same."

The barrel is tilted or turned down to allow the cartridge to be inserted in its rear end. Underneath the barrel is a sliding rod having a projecting finger, which is moved by the action of a lever trigger guard as the end of the barrel is raised, and so extracts the spent cartridge case. The cartridge case is made of thin metal having a flange, and the fulminate composition is placed at the centre of its base. The cartridge case may be coated with "tin or other metal or alloy less liable to oxidise than the case itself."

[Printed, 8d. Drawing.]

A.D. 1865, December 30.—N^o 3379.

HAWKSLEY, GEORGE.—"Improvements in apparatus for closing charged cartridge cases."

Self-acting apparatus is used for "closing central-fire cartridge cases" after they have been filled. A spring is fitted "at the mouth of the cylinder which receives the charged cartridge case," and a clip or plate, or pin, is fitted on "the inner face of the lid which closes the mouth of the cylinder." When the lid is brought round "in the ordinary manner to close the mouth of the cylinder the pin presses against the spring above mentioned, and causes it to embrace and hold the cartridge case tight and fast in the cylinder, while the clip or plate at the same time presses against the base of the cartridge case and assists in holding it."

[Printed, 8d. Drawing.]

1866.

A.D. 1866, January 1.—N° 3.

THOMPSON, NATHAN.—“Improvements in the manufacture of stoppers for bottles and other articles, and in machinery employed in such manufacture.”

Stoppers which may be used for stopping the muzzles of guns are made of “compressed wood rendered hollow or tubular,” the “wood of the osier or willow is used by preference. Short lengths of wood are cut and shaped by self-acting machines. The wood is compressed in a fly press.

[Printed, 2s. 10d. Drawings.]

A.D. 1866, January 5.—N° 43.

CUNNINGHAM, HENRY DUNCAN PRESTON.—“Improvements in working and in the service of guns with fittings thereof, and in gun carriages.”

The breech end of the gun is supported “upon a cranked shaft or axle laid across the sides of the carriage in a position which allows the button or cascable of the gun to rest upon it;” levers are “attached to the outer ends of the shaft or axle, and when these are moved up or down the breech of the gun is lowered or raised.”

The projectiles and ammunition are conveyed to the muzzle of the gun by means of “overhead railways curved round the front or muzzle of the gun” upon which carriages are made to travel.

For heavy guns “a raised curvilinear structure” is applied in the rear of the guns to stop the recoil by receiving a buffer attached to the gun carriage. Grooved rollers are used “for the gun carriage to run in and out upon the slide, raised ways being fitted to the slide,” or “the arrangement may be reversed.”

[Printed, 1s. 4d. Drawings.]

A.D. 1866, January 6.—N° 46.

AMES, HORATIO.—“Improvements in ordnance.” A tube made of mild steel, closed at the breech end, is fixed in a casing of wrought iron, also closed at the breech. For large ordnance two inner tubes of steel, one fixed within the other, may be

employed. The wrought-iron casing is shrunk on so as to fix it permanently, but not "so as to give a permanently and definite initial tension to the outer casing, the object being only to leave the inner tube securely in its place." The wrought-iron casing is made in the manner described in the Specification of prior Letters Patent of January 6, 1865, No. 54, by welding "concentric rings of iron end to end, until the required length of the outer wrought-iron casing is attained."

[Printed, 10d. Drawing.]

A.D. 1866, January 11.—N° 92.

BLAKELY, THEOPHILUS ALEXANDER, and VAVASSEUR, JOSIAH. — "Improvements in projectiles for breech-loading rifles."

"Wire made of copper, brass, or other suitable metal or alloy" is inserted in "grooves formed concentrically or spirally on the periphery" of the projectiles. One wire or thickness of wire, composed of one or more strands, is "inserted in each groove," so that when the projectile is fired "the wire is forced into the grooves or rifling of the gun, and the projectile is thereby caused to rotate."

[Printed, 1s. Drawings.]

A.D. 1866, January 15.—N° 137.

BOXER, EDWARD MOUNIER.—"Improvements in cartridges for breech-loading fire-arms and ordnance."

The cartridge is made "with a coiled thin sheet metal casing," so that the "body of the cartridge shall readily expand, by slightly uncoiling and stretching on firing, so as to fill the chamber, and shall contract slightly after firing."

The case is "choked at the front end into one or more cannelures formed in the bullet disc or plug closing the cartridge." The coiled case is fixed in the metal cap forming the base of the cartridge. "A small portion of loose cotton or other fibre" is interposed "between the bullet and the powder to prevent any escape of the latter." Sheet brass is used by preference "in combination with waxed cloth or paper" to form the outer coil. If sheet metal be used alone "a slight coating of beeswax" is placed on its outer surface. The outer surface when of waxed cloth is coated "with French chalk or plumbago," when

position is placed in a recess in a hollow screwed plug, and is fired by a needle or striker, the parts being "kept separate by a spring." Over the plug is placed "a hollow half sphere of very thin copper," which when crushed in drives the striker upon the fulminating composition and fires the charge. A striking hammer is held by a detent until the drag of a chain releases it, when it strikes and crushes in the copper dome. Another striking apparatus is made by soldering a cup-shaped disc to another cup and fastening a wire to the centre of the disc; the wire may be pulled so as to fire a charge without breaking the fastening of the edges of the disc.

[Printed, 4d. No Drawings.]

A.D. 1866, February 9.—N° 403.

BAKER, FREDERIC THOMAS.—"Improvements in breech-loading fire-arms."

A cartridge extractor fitted on a pin is moved by a lever which is made to work upon a pin passing through the lump, and "in the action" is fitted another pin. When the barrels are tilted or turned down "the lower end of the lever comes in contact with the pin, and the upper end of the lever is thereby caused to press against the end of the extractor pin, and push out the extractor together with the empty cartridge cases."

A steel face piece "is fitted at the back of the breech of central-fire breech-loading arms to receive the blow of the hammer, the nose of which is made solid."

[Printed, 10d. Drawing.]

A.D. 1866, February 10.—N° 422.

BURTON, JAMES HENRY.—"Improvements in the construction of breech-loading fire-arms."

The breech is closed by a breech block which slides vertically in a slot in the rear of the breech end of the barrel, and is worked by a lever placed below the barrel. The block is held in place "by means of a transverse pin, which passes through the side plates of the body, and also through a circular space cut in the side of the block." When the block is depressed the lever action causes a finger extractor to push out the spent cartridge case. A pin striker is made to work in the sliding block. The

cleaning rod or ramrod is secured in place by means of a threaded screw formed on its head which engages in a screwed recess formed in the body or frame.

[Printed, 10d. Drawing.]

A.D. 1866, February 12.—N^o 441. (* *)

LONGRIDGE, JAMES ATKINSON. — (*Provisional protection only.*)—"Improvements in apparatus for facilitating the working and discharge of ordnance below the water level."

"For discharging guns below water I make a port or hole in the side of the ship at the depth desired, and fit and fix thereto a socket piece, through which the muzzle of the gun is placed; this socket piece is furnished with a sluice or slide valve fitted so that the opening can be closed at pleasure when the muzzle of the gun is withdrawn. In addition to this sluice I furnish the gun itself (if it be a breech-loader) with a sluice or valve disposed near the muzzle, which closes the muzzle of the gun when required. The bore of the gun at the muzzle has an enlarged recess which receives a thin disc with an india-rubber washer or packing, which makes the muzzle water-tight, so that when the gun is loaded and is pointed through the socket hole or port no water can enter. When the gun is fired the recoil causes the sluice or slide valve in the gun to be detached, and so closes the bore, so that water can only enter to that point. When the muzzle of the gun withdraws from the socket port the slide valve therein also falls and closes the port. Thus any water entering will only be the small quantity likely to enter as far as the inner slide valve, and contained between it and the outer slide or valve. In muzzle-loading guns, instead of disposing the inner slide valve on the muzzle or chamber of the gun itself, I dispose it in a short length of tube, which forms as it were a continuation of the gun, the inner end being provided with a socket to receive the muzzle of the gun. This separate piece and continuation of the gun barrel fits into and passes through the port socket as before described with reference to the gun muzzle, and is furnished with the recess to receive the closing disc presented to the external water. In loading the gun is drawn back from contact with this tube or barrel of continuation and so loaded at the muzzle. This tube, as also the

" gun in the former case, is drawn back from the socket port for the introduction of the closing disc, which is blown away every time of firing."

[Printed, 4d. No Drawings.]

A.D. 1866, February 13.—N° 443.

LAKE, WILLIAM ROBERT. — (*A communication from Thomas Laidley.*) — (*Provisional protection only.*) — "Improvements in cartridges for breech-loading fire-arms."

Cartridges that may be recharged for use are proposed to be made of a metal case which is flattened to allow the anvil to be inserted; the case is "pinched or crimped" to form an interior ridge, which keeps the anvil securely in its place.

[Printed, 4d. No Drawings.]

A.D. 1866, February 16.—N° 491.

RILEY, WILLIAM SPINKS.—"Improvements in breech-loading fire-arms."

The striker works in a "small hole" in the break-off nearly in line with the axis of the barrel; its end does not "protrude from the break-off when in its normal condition," being pressed back by a spring. The "nearly vertical portion of the hammers" is driven against the heads of the strikers and forces them forward horizontally.

"Underneath each barrel and parallel with the axis of the barrel is a small sliding bar; the rear ends of the bars are joined by a curved plate," which is actuated by a spring and acts as an extractor to push out the spent cartridge cases. "A small lump or projection" is made on the top of each barrel, over and on which the head of the hammer rests.

[Printed, 8d. Drawing.]

A.D. 1866, February 20.—N° 519.

WALSH, JOHN HENRY.—(*Provisional protection only.*)—"Improvements in breech-loading guns and rifles, and in cartridges to be used therewith."

The barrels are made to turn down upon a hinge, which is to be placed "in a line with, and immediately below, the junction of the barrel or barrels and breech plate." A strap or projection is provided at the breech end of the barrels and "fits in a recess

" in the upper side of the breech plate," and has a hole "into which a vertical bolt passes," which also passes through the breech plate behind the hinge pin. The bolt is to be connected with a lever which can be pressed by hand so as to "withdraw the bolt and allow the breech to be opened." Cartridges are to be made taper at the fore end. "The charge of shot and the greased wad" are placed in a thin paper case and fixed in the mouth of the cartridge with gum or cement.

[Printed, 4d. No Drawings.]

A.D. 1866, February 20.—No 529.

NEWTON, WILLIAM EDWARD.—(*A communication from Hiram Berdan.*)—"Improvements in breech-loading fire-arms and in cartridges for the same."

"A swinging breech piece" is hinged at its forward end to the top of the barrel, and is connected by a hinge joint to a rear block or "brace:" two striking pins are used, one in the breech piece, and one in the brace. Both blocks are raised to admit the charge and are fastened when in position by a catch. A hook actuated by a spring, in connection with a spur on the "swinging breech piece," is used as an extractor to push out the spent cartridge case. The barrel is rifled with a groove whose sectional form "is that of an arc having a radius about equal to the diameter of the bore and tangential to the circle of the bore." A cartridge is made "with a cup into which the fulminate priming in the form of a cap, pellet, or otherwise is inserted in such manner as to be entirely contained some distance within the outer face of the head or bottom of the shell, and in the bottom of the cup there is a permanently fixed projection in a rearward direction against which the fulminate priming is driven by the hammer, and which presents a point, or so small a surface that the entire force of the blow of the hammer is so concentrated on a small portion of the priming as to insure its ignition."

[Printed, 10d. Drawing.]

A.D. 1866, February 21.—No 537.

BAYLISS, HENRY.—(*Provisional protection only.*)—"Improvements in brushes or cleaners for cleaning gun barrels and other tubular articles."

A brush suited to clean gun barrels is to be made with a flat ring of suitable metal "of about half the diameter" of the finished cleaner. A series of short wires are "arranged in the ring in a "tubular form," and are bent "outwards on both sides of the "ring," half lying against "one of the flat sides of the ring half "against the other flat side of the ring." The doubled wires are made "to lie radially," like the bristles of a brush. The ring of wires "may be fixed to a cylindrical holder" by a screw.

[Printed, 4d. No Drawings.]

A.D. 1866, February 22.—N^o 548. (* *)

WALKER, JOHN.—"Improvements in the construction of vessels "of war, forts, and batteries, and in mounting and working guns "therein." The invention consists, firstly, in constructing those portions of the sides of vessels of war and those portions of forts and batteries where the portholes are situated.

Secondly, in improved modes of mounting and working guns in vessels of war, forts, and batteries. "I first mount the gun "slide upon which the gun carriage is supported upon a shaft "free to revolve in a socket or tube carried through the deck or "floor, and free to move in an elongated slot, the inner face of "which is circular at both ends." "In order to retain the gun "when trained, I either use blocks or I apply a worm to work "into a worm wheel on the head of the shaft. The worm may be "used not only to retain the gun in the required position, but "the gun may also be trained by it. After firing the gun may "be turned round for loading. In order to work guns in pairs "and to communicate an up-and-down motion to them, to allow "of one gun being raised for firing while the other is lowered and "protected to be loaded, I support the bottom of the pipe or "socket" "of one gun slide on a bed plate," "attached by chains "to a drum" "on or forming part of a horizontal shaft," "and "on one side of that shaft, and I connect a platform" "to the "top of the socket. I cut away or leave a space in the deck or "floor to receive the platform. I make similar arrangements and "connect the pipe or socket of another gun slide on the opposite "side of the same horizontal shaft." "Round the apertures in the "deck or floor I erect a short screen," "which, when the guns are "in position for firing, comes below the level of the mouth "thereof. One gun and apparatus balances the other, and sup- "posing them to be fitted amidship in, for instance, a gunboat,

" the guns may be made to sweep the horizon." " Should two guns not be required, then a weight or weights to balance one gun and apparatus must be connected to the horizontal shaft." " Instead of running guns out for firing I simply bring the muzzles up to or near the portholes or embrasures, and to protect them and to carry off the smoke consequent on the discharge I place a tube on the outside of the gun " " and run it out when the gun is ready for being fired by sliding it along the gun. In constructing new guns I flute the outside of the barrel, but for guns already constructed I place longitudinal ribs in the inside of the tube; thus recesses are formed, through which the air is drawn and the place of discharge ventilated on the firing of the gun."

[Printed, 10d. Drawing.]

A.D. 1866, February 24.—N° 578.

NEWTON, WILLIAM EDWARD.—(*A communication from Theodore Thaddeus Sobrieski Laidley.*) — "Improvements in breech-loading fire-arms."

The breech is closed by a breech block, which is fitted in "a longitudinal mortise," and "opens and closes with a swinging movement about a horizontal pin, which has suitable bearings in the two sides of the frame." A cam is arranged "on the same axis as the breech piece for the purpose of throwing back the locking piece, so that by means of a stop on the cam the breech piece may be opened by the simple motion of the cam." A pawl may be attached to the locking piece or "brace," and is "operated by the hammer or tumbler for the purpose of throwing it back."

[Printed, 10d. Drawing.]

A.D. 1866, February 26.—N° 592.

CLARK, WILLIAM.—(*A communication from Jules Félix Gévelot.*)—"Improvements in pin cartridges."

The orifice which is made for the pin in the cartridge case at its rear end is formed by forcing in a punch, which "instead of removing the copper and pasteboard," as is done by the action of a drilling tool, forces those materials "inwards in the form of a cone." When the explosion takes place the forced in materials are driven back close round the pin and prevent escape of gas. A "strengthening

“ tube ” and “ a lead thimble or strengthening piece ” may be applied to the rear end of the cartridge to give additional strength.

[Printed, 10*d.* Drawings.]

A.D. 1866, February 26.—N° 593.

RYDBECK, SVEN.—(*Provisional protection only*).—“ Improvements in breech-loading fire-arms.”

The breech is to be closed by a sliding bolt in which a needle striker is made to work. The bolt is moved by a lever motion, and is secured in its place by a catch, or by a plug, which is fitted in “ a transverse groove.”

[Printed, 4*d.* No Drawings.]

A.D. 1866, February 28.—N° 610.

COHN, DAVID LEOPOLD.—(*A communication from Joseph Grünbaum*).—(*Provisional protection only*).—“ Improvements in breech-loading revolving fire-arms, and in apparatus for extracting cartridges or cartridge cases therefrom.”

A cylinder is proposed to be fitted “ in a block behind the barrels ; ” on its face “ a striker is formed, while the rear end carries a pin or projection.” The lock action moves round the cylinder and striker, and discharges the barrels successively. A moveable frame applied to the ends of the barrels is made to catch the flanges of the metallic cartridge cases, and so acts as an extractor to withdraw them after discharge.

[Printed, 4*d.* No Drawings.]

A.D. 1866, March 2.—N° 636.

EVELYN, GEORGE PALMER.—(*Provisional protection only*).—“ Improvements in the construction of projectiles for ordnance and fire-arms.”

The projectile is proposed to be made with “ a helical groove extending from the base to the head thereof.” The groove has one edge “ bevelled away to a rounded surface so as to offer little or no resistance to the rotary motion, which motion is caused by the opposite edges of the grooves being formed with a surface corresponding, or nearly so, to radii drawn from the central horizontal line, or the centre of the transverse vertical

"section of the projectile." The groove may be made deep at the rear part of the projectile and be made gradually less deep at the front part.

[Printed, 4d. No Drawings.]

A.D. 1866, March 5.—N° 673.

NEWTON, WILLIAM EDWARD.—(*A communication from James Tyler Ames.*)—"Improvements in the construction of ordnance."

The rear part of the cannon is "made of wrought iron, steel, or other suitable metal," and "the forward end thereof is turned to a bevel." The rear part is then placed in a mould into which molten cast-iron is introduced through "passages made in a tangential line to the circle so as to cause the metal while it is in a molten state to revolve in the mould as in the well-known way of casting iron rolls, or the entire mould is caused to rotate, so that the breech part within the mould may become highly heated and expanded before the cast metal unites with it." The casting when "solidified and cooled down" is taken out of the mould and finished in the ordinary way.

[Printed, 8d. Drawing.]

A.D. 1866, March 6.—N° 677.

HENRY, MICHAEL.—(*A communication from Pierre Joseph Jarre.*)—"Improvements in fire-arms."

The improvements are based upon those described in the Specification of prior Letters Patent, dated June 10, 1861, numbered 1486.

The cartridges or charges are "presented to the cock or hammer one at a time by means of a moveable and separable breech or breech piece propelled across the arm." A carriage is made to move in "guide ways," to and fro between the trigger and the cock, being "propelled by a knob" on the trigger. The carriage carries a moveable head "intended to propel the breech piece." The breech piece is provided with holes to receive the cartridges, which are fastened in place by lids. "A spring is fitted to the carriage and engages in the mainspring of the arm." A jointed "tail piece" is attached to the trigger, "and works in a slot in the guard." By placing one finger "on the trigger itself and the other on the tail," the cock is raised, and by moving the trigger "without working the tail" the cock is made to fall and discharge the arm.

[Printed, 8d. Drawing.]

A.D. 1866, March 6.—N° 688.

RICHARDS, WESTLEY. — "Improvements in breech-loading fire-arms and cartridges."

The improvements are in part based upon those described in the Specification of former Letters Patent, dated March 25, 1855, No. 633.

The breech end of the barrel is closed by a breech block, which is connected with and slides upon the under side of a hinged lever. The front of the block "comes to within a short distance of the end of the barrel," and to prevent the escape of the gases of the exploded powder the base of the cartridge employed is constructed "with a metal capsule cast or formed solid in some distance up," having an "inner metal lining" and a tube of paper or other suitable material "projecting beyond its end" to form a continuation to the cartridge. The cartridges are exploded by a striker "passed in an inclined direction through the block," which is driven forward by the hammer when it falls. The striker is "brought back" by the action of an "ordinary bent spring." A cartridge extractor, consisting of a sliding piece working "in longitudinal guides on one side of the barrel," is moved "by a nib" on the hinged lever, which when raised "comes against a stud on the extractor," whose end catches a flange on the cartridge case and pushes it from the barrel.

[Printed, 1s. 4d. Drawings.]

A.D. 1866, March 9.—N° 714.

HARVEY, CHARLES. — (*Provisional protection only.*) — "Improvements in breech-loading fire-arms."

The cartridges are discharged by a pin striker, upon its head it is proposed to form "a shoulder or cam surface," against which a stud on the cock is made to bear, "so as to draw back the pin in the act of cocking the gun." The cock has a shoulder which strikes against the head of the pin and drives it forward. On the axle pin on which the barrels turn is to be fixed a cam, which "is so formed as to bear upon the end of the extractor," and by causing it to protrude push out the spent cartridge case.

[Printed, 4d. No Drawings.]

A.D. 1866, March 9.—N° 722.

RESTELL, THOMAS. — "Improvements in breech-loading fire-arms, and in cartridges to be used therewith."

The breech end of the barrel is closed by a sliding plug which is "affixed to a long rod, which serves as a guide, upon its under side." The guiding rod slides in a recess formed for it under the barrel; its use enables the ordinary breech box or chamber for the breech plug to be dispensed with. The needle striker works in the breech plug. In cases where percussion caps are used "a plate with overlapping flanges" is attached to the barrel and serves as "a guide for receiving and retaining any given number of caps," and presenting them in a proper position to the nipple. The bands used for fastening the barrels are made "without a joint," and are tightened by means of a clamping piece which "binds against the under side of the stock. A cartridge containing its own ignition is made with a sabot formed of "box-wood, papier maché, or other suitable substance." In the centre of the hinder end is a recess for the percussion cap, and an annular recess is formed to receive a small charge of gun cotton or other explosive substance, which blows out the sabot. A packing ring of india-rubber is inserted in the front of the sabot.

[Printed, 1s. 2d. Drawings.]

A.D. 1866, March 14.—N° 760.

RUSS, EDWIN, HAMMOND, HENRY, and HAMMOND, EDWIN.—(*Provisional protection only*).—"Improvements in fire-arms."

A solid plug is proposed to be used to close the breech end of the barrel, to which is attached a trough-shaped metal plate. The solid plug is to be hinged to the side of the plate and be moved by a lever. Either pin cartridges or percussion caps may be used.

[Printed, 4d. No Drawings.]

A.D. 1866, March 14.—N° 766. (* *)

MERRIAM, SCOVIL STURGIS.—"An improved submarine and "torpedo boat." The invention consists in the construction of a vessel for submarine purposes, of which the bottom or lower part consists of a heavy cast-iron bed plate, of the required shape, forming part of the vessel, to which the plating of the vessel or the other part of the hull is attached, the bed plate containing the necessary tanks for the water ballast. Also in the arrangement of suspended weights or ballast attached to ropes or chains, and

capable of being brought above the lowest part of the bottom of the vessel, or of being let down to any desirable depth. These weights, called "suspended ballasts," are arranged near the ends of the vessel and amidships, and are capable of being raised into recesses made in the vessel's bottom, or lowered to any depth below by means of windlasses. The ropes or cables on which these weights are suspended pass over suitable pulleys through air-tight tubes or channel ways to the windlasses, such pulleys and windlasses, as well as part of the gearing to work the windlasses, being situated in air-tight boxes, with only the shafts to operate, the windlasses passing through suitable stuffing boxes into the working compartment. By this arrangement the ropes or cables can freely pass through suitable large holes in the bottom of the vessel, without requiring any stuffing boxes for the ropes or cables to run through. When these weights are suspended some distance below the vessel, they keep the same steady and upright in the water, and prevent her from rolling or pitching. When lowered, so as to rest on the bottom of the water bed, the vessel will be relieved of so much weight or ballast, and will be caused to rise and ascend by simply unwinding the ropes or cables without the necessity of forcing the water, which acts as part of the ballast, out of the water tanks, and by winding up the cables again the vessel will be made to descend again to the bottom.

Further, in the arrangement of a bar at the bow of the vessel, capable of having a torpedo or exploding shell attached to its end, and operated from the inside of the vessel in such a manner as to move the bar either under the bottom of the vessel, for the purpose of attaching the torpedo or exploding shell, or to cause the end of it to project some distance forward of the vessel. The interior of the vessel is divided into several compartments, forming air chambers, for the purpose of containing compressed air to supply the working compartment with fresh air when required, as well as to drive an engine to propel the vessel. And in the manner of inclosing one or all the doors in the bottom of the vessel, by a chamber or box capable of being entered from the working floor, and of being closed perfectly air-tight, to enable such door or doors to be opened without the necessity of filling the whole of the working compartment with the pressure of air necessary to resist the pressure of the water.

The propeller wheel for this vessel is supported in a swinging frame, which is worked like a rudder, and being connected to the propeller shaft, by means of an universal joint, can be turned

either to the right or to the left, operating therefore so as to serve at the same time as a rudder for steering the vessel. Near the propeller at the after part of the vessel, and on each side near the centre line of the same, horizontal rudders are arranged for the purpose of regulating the descent or ascent of the vessel while in motion.

[Printed, 1s. Drawing.]

A.D. 1866, March 16.—N^o 789.

JOHNSON, JOHN HENRY.—(*A communication from Christian Sharps and Horace Edward Dimick.*)—"Improvements in breech-loading fire-arms."

The improvements are based upon those described in the Specification of prior Letters Patent, dated November 11, 1852, No. 712, and relate to what is known as "Sharps' rifle," and means which enable it to be used with metallic cartridges containing their own ignition. In the frame of the piece an opening is made, in which works "a vertically sliding breech piece," the end of the barrel being recessed to receive the flange of the metallic cartridge. The breech piece is depressed by the arm of a lever which also acts as the trigger guard, to allow the cartridge to be inserted, and the downward motion of the breech piece is arrested by a catch. The discharge is effected by the hammer striking "a moveable block fitted loosely into the upper part of the sliding breech piece, which block is struck by the hammer in its descent, and transmits the blow to the cartridge." A projecting finger connected with the lever is made to act as an extractor, and push out the spent cartridge case.

[Printed, 8d. Drawing.]

A.D. 1866, March 17.—N^o 790.

WETHERED, EDWIN ROBERT.—"A new and improved method of indicating the shot mark on a target at ball practice."

A coloured disc, made of wood, metal, or other material, is suspended in front of the target, and guided by ropes which pass over pulleys fixed in arms or uprights attached to or fixed near the target. By pulling the required ropes the disc is raised or lowered, or moved to the right or the left, so as to cover any spot on the target, and indicate the position of the "hit" made.

[Printed, 8d. Drawing.]

A.D. 1866, March 19.—N° 806.

SYLVEN, THOMAS GEORGE.—“Improvements in breech-loading guns.”

The barrels are tilted or dropped down to allow the cartridge to be inserted in the breech end. In a recess in the breech block is placed a striking pin, sliding horizontally “in a line with the axis of the barrel. A pin, having a wedge-shaped lower end, works in a vertical hole, behind the horizontal pin; when the hammer falls it drives down the vertical pin, and the inclined surface on its lower end acting on that of the rounded head of the horizontal striker, drives the latter forward and explodes the cartridge.

[Printed, 8s. Drawing.]

A.D. 1866.—March 20.—N° 822.

BURR, ARTHUR RICHARD.—(*Provisional protection only*).—“Improvements in the manufacture of gun and pistol barrels, and in machinery to be employed in the said manufacture.”

Barrels are proposed to be made by coiling rods of “gun iron” into a helical shape,” and welding them so as to form a rough tube or mould, which is rolled upon a mandril. The moulds may be rolled by passing them through “these rolls, rotating in the same direction.” The bars may be twisted in a twisting machine made like those used for twisting ropes.

[Printed, 4s. No Drawings.]

A.D. 1866, March 20.—N° 826.

ALDERSON, HENRY JAMES.—(*Provisional protection only*).—“Improvements in hollow projectiles.”

Hollow projectiles are proposed to be made of steel or other suitable material, with a head of “a pointed ogival form, which is the form best calculated to effect penetration.” The head is attached to the body of the projectile by screws. The bursting charge may consist of gunpowder, gun cotton, nitro-glycerine, or any other suitable explosive mixture.

[Printed, 4s. No Drawings.]

A.D. 1866, March 21.—N° 834.

BROOMAN, CLINTON EDGECUMBE.—(*A communication from John Webster Cochran*).—“Improvements in projectiles and in cartridges.”

In the surface of the projectile at its rear end is a circumferential groove from which longitudinal grooves are made to the rear end of the projectile, leaving between them "fins or ribs" alternately thicker and thinner." Around the faces of these fins is "fitted a band of copper or other comparatively soft but tough metal." The front part of the band is contracted to fit in the circumferential groove. Longitudinal grooves are made in "the faces of the thicker fins." Lubricating matter is placed in the circumferential groove, and "fibrous material saturated with tallow or other suitable lubricating material" is lapped round the projectile and covered with copper wire. The gases of explosion enter the longitudinal grooves made in the projectile, and expand the covering band so as to fill the rifle grooves. A cartridge is made with a disc or ring placed in its base, "with an annular groove in its rear surface containing the fulminate priming," so placed that it is isolated from the powder" until the explosion takes place, when the disc is forced forward and the fire from the fulminate passes through a central hole, and reaches the powder.

[Printed, &c. Drawing.]

A.D. 1866, March 22.—N° 845.

DIXON, WILLIAM ALLEN.—"Improvements in pyroxilin or gun cloth charges for all kinds of fire-arms."

The combustion of gun cotton in a loose form "is so rapid and sudden as to render its use for fire-arms very uncertain and dangerous, and to utilise and render it safe for projectile purposes it is therefore necessary to retard this inclination to rapid combustion." This is effected "by a variety of means," varied according to the rate at which it is desirable to let the charge burn, and this depends upon the strength of the barrel, the weight of the projectile, frictional and atmospheric resistance, and other conditions, the rule being, the greater the charge the slower the combustion." The result is obtained when gun cloth is used by tightly winding it and enclosing it in a case of "paper, metal, cloth, or spring; or by interposing alternate layers of "non-explosive, and by preference also in combustible materials;" or by weaving or otherwise incorporating with pyroxilin, and making up the same in any form, such as wads or pellets, and

“ in any suitable proportion, any non-explosive or non-combustible material.”

[Printed, 6d. No Drawings.]

A.D. 1866, March 22.—N° 847.

JACKSON, JOHN. — “ Improvements in breech-loading fire-arms.”

The barrels are tilted or turned down to receive the charge, a striker working in a recess in the break-off is moved by “ a slide working in the lock plate,” which is driven forward by the fall of the hammer.

In the top rib between the barrels is a cylindrical hole, in which works a cylindrical rod, and a similar rod works in a similar hole in the bottom rib. The rods carry “ a cross piece situated in a plane parallel with the ends of the barrels,” and “ curved to the curvature of the breech ends,” which are cut away to allow it to lie flush with them. The rods are connected with coiled springs, which, when the barrels are raised, push out the cross piece, making it act as a cartridge extractor. When the cartridges are inserted, their flanges bear against the cross piece, and when the barrels are shut down and the cartridges are pushed home, pressing the curved cross piece. In some cases the extractor may be actuated by a single coiled spring “ situated under the middle of the cross piece.”

[Printed, 8d. Drawing.]

A.D. 1866, March 22.—N° 850.

BURTON, JAMES HENRY. — “ Improvements in the construction of breech-loading fire-arms.”

The breech is closed by a block moved by a lever that works beneath the stock, abutting against a fixed block to which the barrel is screwed. The breech block is hinged on a pin “ immediately below the rear end of the barrel,” and is worked by a finger lever below the stock. When the piece has been discharged, the hammer is drawn back, and the breech block is “ pulled down by its handle in one motion.” A stud fixed “ on the boss of the moveable breech piece ” then comes “ against the flange of the cartridge,” and acts as an extractor to withdraw the spent cartridge case. The cartridges are discharged by a pin striker work-

ing in the moveable breech piece, and driven forward by the hammer; it is brought back into position by means of a stud attached to a spring catch that fastens the breech block, and it is prevented by a stop from acting, unless the breech piece is in its place.

[Printed, 10*d*. Drawing.]

A.D. 1866, March 23.—N° 864.

WILSON, THOMAS.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms and ordnance."

The breech end of the gun is to be closed by a block hinged at the side of the frame and turning on an axis parallel to that of the barrel.

In some cases the block may be hinged at the front of the frame. The extractor may be moved by "a thumb bit or plate," or by connecting it with the hinge of the block. The breech may be closed by "a plug working longitudinally in the rear of the barrel," and having a swell or projection, which, when the plug is turned, engages in a recess in the breech frame. The cartridge case is withdrawn by means of an extractor hook.

A cartridge case is formed by inserting a paper case, having a base made of pulp, in a metal base cup. The anvil on which the cap is placed may be made tubular, or of sheet metal bent so as to have in cross section the form of the letter **N**.

[Printed, 4*d*. No Drawings.]

A.D. 1866, March 23.—N° 868.

ERSKINE, JAMES.—"Improvements in apparatus for filling cartridges for breech-loading guns."

The cartridge cases are placed in recesses in a frame, and are covered with a board surface having holes corresponding with the cases. The cases are then simultaneously filled with powder, another board frame is then brought into action, by means of which the wads are inserted simultaneously, and afterwards the shot charges are filled in in like manner. "In this manner a hundred or even five hundred or more cartridges may be filled with great facility and in a short space of time."

[Printed, 1*s*. 4*d*. Drawings.]

A.D. 1866, March 24.—N° 880.

ELEY, WILLIAM THOMAS.—"Improvements in central-fire breech-loading cartridges."

“ in a curved recess formed in the fore end of the stock of the gun by the act of opening or closing the breech end.” The upper end of the lever passes through a slot formed between the barrels and into another slot in the extractor rod, so as to prevent the extractor being withdrawn while the gun is together, and affording facility for its being removed to be cleaned. “The lower end of the lever bears against the under part of the body of the action of the gun,” so that the upper end moves the extractor when the breech is opened or closed.

The lock of gun is so placed “ that the axle of the tumbler is in about a line with the back of the action, and the hammer is made in one piece instead of employing a separate striker, so that when down the nose will project slightly through a slot cut in the back of the action.” The cap placed in the cartridge is struck thereby centrally.

“ A round pin having a lever arm thereon ” is employed for attaching the barrels to the stock. The central part of it is partly cut away, and an opening made in the loop on the barrels, “ which when the lever is moved forward ” allows the parts to separate, but when it is moved backwards secures them together. In some cases a round hole may be made in the loop for the pin to pass through. A spiral groove is cut in the pin, “ into which a fixed stud enters.” By moving the lever “ the pin will be forced outwards or withdrawn from the loop.”

[Printed, 10d. Drawing.]

A.D. 1866, April 7.—N° 997.

HUGHES, EDWARD THOMAS. — (*A communication from James Benjamin Doolittle and George Otis Downing.*) — “ Improvements in revolving fire-arms.”

The rotating chamber cylinder has the rear part of it cut away, “ retaining only so much of the entire cylinder as will ” form the front parts of the chambers, and “ enclose the ball, and just extend over the front of the cartridge shell.” A moveable cover or “ yoke ” is connected with the lock action, and as each partial chamber is moved up in a line with the barrel it covers and completes the charge chamber. The barrel is removed to charge the chambers by turning “ it from the notches in the frame which secures it thereto.” When in position the cylinder is locked by a latch that takes into a recess formed in the barrel.

[Printed, 1s. Drawings.]

A.D. 1866, April 11.—N° 1033.

CROFTS, JOHN.—“Improvements in breech-loading fire-arms.”

The barrels are turned down to receive the charge “on the break-down principle.” A pin “passes through the false breech vertically.” A cam is formed on its lower end, “which engages in the grip or lump on the under side of the barrels.” The upper end of the pin is provided with a lever working in a horizontal plane on the back strap. The under side of the lever, where it fits on the pin, is furnished with a collar which fits into a counter sinking on the false breech, where the pin passes through. A distance pin or stud is fixed in the under side of the body to regulate the play of the cam, and a spring at the back of the false breech operates upon the back of the cam to throw it into the catch of the lump or grip in the bottom of the barrel. Instead of a cam a bolt may be employed working horizontally and in the arc of a circle passing into or through the lump.” The inside of the under part of the body may be made flat to enable “the whole of the under action” to be covered by the stock.

[Printed, 6d. Drawing.]

A.D. 1866, April 14.—N° 1061.

BONNEVILLE, HENRI ADRIEN. — (*A communication from Charles Victor Plumerel.*) — “Improvements in apparatus for removing exploded cartridges from breech-loading fire-arms.”

A tube formed in two parts or longitudinal sections is fitted in the breech end of the barrel in such a manner that it may be readily inserted and withdrawn. The two parts of the tube are connected by a hinge joint. The cartridge is placed in the tube, which is then pushed into the rear end of the barrel, and the piece is fired. After the discharge the tube with its cartridge is withdrawn, bringing with it the fouling deposits. The tube is then cleaned, loaded with another cartridge, and replaced in the breech.

[Printed, 4d. No Drawings.]

A.D. 1866, April 18.—N° 1087.

DE CAESARIS, CLEMENTE.—(*Provisional protection only.*)—“Improvements in projectiles,”

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The projectile is to be made with a recess in the rear end, "and about the annular body of metal surrounding such recess three or more slots or openings" are formed in the direction of the length of the projectile. The slots allow the metal to be easily expanded, and to fill the rifle grooves when the charge is fired.

[Printed, 4d. No Drawings.]

A.D. 1866, April 19.—N° 1101.

WILSON, EDWIN.—"Improvements in breech-loading fire-arms."

In order to keep the breech of "turn-down" barrels gas-tight in case of wear, "the pin which passes through the action to act on the lump from the barrel, and which serves as the axis of motion of the parts in supplying fresh charges," is made in a conical form, and is adjusted by means of screws, so as to make the barrel fit closely against the face of the break-off. An abutment is also applied "in a recess or groove formed for it in the boss of the fixing lever opposite the grip, to throw the strain off the axis of that lever, by which a lever acting as a single grip may be rendered as effective as a double grip."

[Printed, 10d. Drawing.]

A.D. 1866, April 20.—N° 1109.

WEBB, WILLIAM.—"Improvements in the manufacture of ordnance."

Upon a tube of steel or iron is cast an outer "coating or body" of brass. Or rings of brass are shrunk or otherwise fastened upon an interior tube made of steel, or welded coiled iron, which may be rifled in any convenient manner.

[Printed, 8d. Drawing.]

A.D. 1866, April 27.—N° 1187.

SOPER, WILLIAM.—"Improvements in the mode of mounting targets for rifle ranges, and in the construction of markers' screens and signals designed for use with the same."

The target plates are mounted on "friction wheels or rollers, by which the plates are supported upon suitable framing in such a manner as to be readily removed to any required position," and to be placed separately or "in sets of any desired number."

A marker's screen is made of iron plates, and is provided with a "vertical aperture through which signals are exhibited," and

flanges to protect the marker from pieces of shot rebounding from the target.

For signalling, three discs are used, "arranged in a triangular form upon the top of a pole." The discs are of three colours, representing respectively "bull's-eye, centre, and outer," and the face of one is exhibited while the faces of the other two are concealed.

[Printed, 1s. Drawings.]

A.D. 1866, April 30.—N° 1221.

DEAKIN, WILLIAM, and JOHNSON, JOHN BAGNALL.—"Improvements in the manufacture of hollow projectiles."

The improvements relate to the application to the manufacture of projectiles of the apparatus and processes described in the Specifications of prior Letters Patent, dated respectively April 23, 1863, N° 1024, and January 19, 1864, N° 139, and May 15, 1865, N° 1341. A heated bloom or block of steel is forged or rolled and made of the required size. A hole is then drilled in it and is afterwards punched out. The piece of metal is then again forged or rolled upon a mandril. The front part of the projectile may be shaped by using a suitable stamp or suitably shaped hammer.

Spiral grooves may be formed upon the projectile, which are filled with explosive compound, and being ignited by the firing of the charge give rotation to the projectile.

[Printed, 8d. Drawing.]

A.D. 1866, May 3.—N° 1258.

POST, JARED WILSON, and CRANSTON, WILLIAM MCINTYRE.—(*A communication from Ephraim Lauriston Pratt.*)—"Improvements in scrapers for cleaning gun barrels and other tubes."

"A number of spring arms" are attached to the end of a rod. The arms may be made of steel wire; they are "furnished at their ends with scrapers of brass or other suitable material," which are made to turn on pivot joints. When the rod is pushed down the barrel the arms yield, and when the rod is pulled back the scrapers are pushed out and clean the barrel.

[Printed, 8d. Drawing.]

A.D. 1866, May 7.—N° 1300.

CROSS, WILLIAM WHEELER.—“Improvements in working the
“ extractors for central-fire guns.”

The extractor is attached to “the breech end of the part of the
“ action termed the fore end,” upon which is fixed “a movable
“ stud or pinned lever, and in the rod of the extractor at the end
“ furthest from the breech,” a slot is made, “in which the lever
“ stud on the fore end engages.” When “the break down is
“ brought into use the lever stud in the fore end working in the
“ slot forces the extractor out, and with it the empty cartridge
“ case, the closing of the parts together forcing the extractor
“ home again.”

[Printed, 8d. Drawing.]

A.D. 1866, May 10.—N° 1339.

COLE, JOHN, and MELLAND, GEORGE STEPHENS.—“An
“ improved mode of and means for extracting cartridge cases from
“ breech-loading fire-arms.”

The barrels are tilted or turned down to receive the charge.
Underneath the barrels is placed a flat piece of steel, which acts as
the extractor. It has an opening formed in its centre. The lump
on the barrels passes through it, and receives in a recess a catch
bolt worked by a lever below the barrels. The extractor piece has
a lip at the back or breech end, and two “horns or projections”
at the forward end, which fit in recesses formed in the lower part of
the breech piece. When the barrels are turned down “the edges
“ of the recesses act on the projections or horns like a cam,” and
push back the extractor, the lip of which catches the rims of the
spent cartridge cases, and pushes them from the barrels.

[Printed, 8d. Drawing.]

A.D. 1866, May 10.—N° 1341.

BLECKMANN, JOHANN HEINRICH AUGUST.—(*A communication from Wilhelm Fehleisen and Ernst Fehleisen.*)—“An improved
“ explosive compound.”

Sawdust freed from resinous particles or other cellulose substances in a state of powder, saltpetre or nitrate of potassa, and charcoal, and sometimes ferrocyanate of potassium, are mixed together to form an explosive compound. The proportions used

are 9 parts by weight of sawdust, 3 to 5 parts of charcoal, and 45 parts of saltpetre. When ferrocyanate of potassium is used 1 part by weight is added. The substances are well mixed and moistened with a pint of water to about a cwt. of mixture, and then crushed and ground in a mill, and afterwards made into cake, and granulated like ordinary gunpowder.

[Printed, 4d. No Drawings.]

A.D. 1866, May 11.—N° 1361.

HUNT, THOMAS.—“Improvements in breech-loading fire-arms.”

The breech is closed by a breech block attached to a cover and turning on an axis parallel to the barrel. The spent cartridge case is withdrawn by an extractor worked by a screw action connected with a short cylinder working on the axis of the breech block. A sliding rod or striker works in the breech block; it is “acted upon by a spiral spring, which brings it into a position to “be struck when the hammer falls.” After the hammer “has struck forward the sliding piece it frees itself from it, to allow the cover of the breech block being turned up to withdraw the empty cartridge case without first raising the hammer.” The sliding piece “is arranged so that it can rotate in its passage in the block sufficiently to admit of the hammer being raised without first opening the breech.”

[Printed, 1s. 4d. Drawings.]

A.D. 1866, May 12.—N° 1367.

PRYSE, CHARLES, and REDMAN, RICHARD.—“Improvements in breech-loading fire-arms.”

The barrels are tilted or turned down to receive the charge. An extractor is attached to a stem which slides in the metal lump between the barrels; its upper side is “bevelled to fit into the angle between the two barrels.” The barrels turn on an axis “fixed in the end of the metal body of the stock by a screw, and intermediate of the width of the iron body where the axis passes through it” there is fixed a stud. On turning down the barrels the stem of the extractor acts against the stud, and is pushed out, withdrawing the spent cartridges with it by means of a projecting lip.

[Printed, 8d. Drawing.]

A.D. 1866, May 15.—N° 1378.

GRAFTON, HENRY.—(*A communication from William Rudolph and Augustus Braun.*)—"Improvements in gun locks."

A recess or chamber is made "in the main plate of the lock for the reception of the works of the lock," so as to obviate the necessity of cutting away too much of the stock. The plate or cover which encloses the works is "let into the stock and forms a steadiment for the lock."

[Printed, 8d. Drawing.]

A.D. 1866, May 16.—N° 1396.

NEWTON, WILLIAM EDWARD.—(*A communication from John Burke.*)—"Improvements in breech-loading fire-arms."

The barrel or barrels is or are tilted or turned down to receive the charge. A hinge joint is formed by securing "the front or upper portion of the stock and hinge to the barrel, and securing the breech piece and lower portion of the hinge to the butt of the stock."

A cartridge extractor is "protruded and retracted" by means of a cam action, connected with the hinge pin. The barrel is held firmly in its place when in position for firing by means of a "locking bolt, made to slide in a groove cut partly in the lock plate and partly in the breech."

[Printed, 1s. 6d. Drawings.]

A.D. 1866, May 18.—N° 1411.

SHARP, JAMES, and SMITH, ROBERT.—(*Provisional protection only.*)—"An improved combustible and inextinguishable compound."

The compound is proposed to be made by mixing "4 parts of nitre, 2 parts of charcoal, and one part of sulphur, with the addition of two parts of gunpowder, or $3\frac{1}{2}$ parts of nitre, one part of charcoal, $\frac{1}{2}$ part of chlorate of potash, $\frac{1}{2}$ part of ferrocyanide of potassium, and one part of sulphur, with the addition of one part of gunpowder."

[Printed, 4d. No Drawings.]

A.D. 1866, May 19.—N° 1417.

FOSBERY, GEORGE VINCENT.—"Improvements in the lock and other parts of breech-loading fire-arms, and in cartridges for the same."

The lock plate and trigger plate are forged in one piece, the tumbler "is formed with a trunnion on each side, by which it is supported, so as to turn freely in bearings formed in the lock plate and bridle," and deliver its blow "in a direct line with the centre of the barrel." The breech is closed by a plunger attached to a lid hinged to the front part of the charge chamber, and the needle or striker works in the plunger. The needle is driven forward by a striking bolt having projections upon it that are moved by the tumbler. A projecting piece is connected with the hinge of the lid and acts as an extractor to withdraw the spent cartridge case. The cartridge case is made of thin sheet metal, or of paper covered with blacklead or tin foil, and a coating of copper is deposited upon it by the electrotpe process. In some cases the interior case may be melted or burnt out, leaving a thin casing of copper. The base of the cartridge is formed of copper.

[Printed, 1s. Drawing.]

A.D. 1866, May 25.—N° 1460.

EMME, JOHN.—"An improved cartridge extractor for breech-loading guns."

The barrels are tilted or turned down to receive the charge, and an extractor "with a double segmental head" is attached to slides, which lie "in shallow grooves cut in the upper surface of the action." The extractor is held "in its position against the barrels by means of a pin working in a hole between the two barrels, and a second pin working in a slot cut through the steel lump. The slides are each provided with a foot projecting at an angle downwards and forwards, and fitting in slots or recesses formed in the action on each side of the steel lump." The recess is slightly wider at the bottom than at the top, and the extractor is protruded and drawn back as the breech ends of the barrels are raised and depressed.

[Printed, 8d. Drawing.]

A.D. 1866, May 25.—N° 1464.

PURDEY, JAMES.—"An improvement in breech-loading fire-arms."

An indicating pin is attached to the breech of the gun intended to be charged with central-fire cartridges. The pin is connected with a small crank lever, let into a recess formed in the breech

piece, and whenever a cartridge is in the gun it causes the pin to protrude, and indicate that the gun is charged. When there is no cartridge in the piece, the pin is depressed by the action of a spring.

[Printed, 8d. Drawing.]

A.D. 1866, May 28.—N° 1478.

BOYLE, SARAH JEMIMAH, sole administratrix of Thomas Boyle.—“ Utilizing the explosive force of discharges in guns and “ fire-arms, and in diminishing or preventing the recoil.”

Openings or passages are made in the barrel of the gun at the breech end, and “ are closed by suitable valves, discs, or wads,” which are so arranged as “ to be capable of resisting the force of “ the explosion.” They are made to open “ just as the shot is “ about to leave the gun,” and so allow a “ free communication “ with the outer atmosphere ” at that time.

[Printed, 8d. Drawing.]

A.D. 1866, May 28.—N° 1484.

ERSKINE, JAMES.—(*Provisional protection only*).—“ Improve- “ ments in apparatus for turning over or closing the ends of “ cartridges.”

The socket in which the cartridge is held while it is being closed is to be made short so as to receive part instead of the whole of the cartridge case. The cartridge case may be held by the hand, so as to prevent it from turning round while the edge is being turned in.

[Printed, 4d. No Drawings.]

A.D. 1866, May 29.—N° 1489.

WOODWARD, THOMAS, and FALLOWS, GEORGE.—“ An “ improved method of extracting cartridges and cartridge cases “ from fire-arms.”

The barrels are tilted or turned down to receive the charge, and “ an extractor of a semi-annular form ” is mounted on a rod, and is worked in a socket under and between the barrels, by means “ of a lever of a semi-annular form, having a tongue or pro- “ jection at one end.” The lever is “ fitted into a semi-annular “ slot or groove cut in the fore end or strap, and in that part in “ which is situated the joint of the gun.” The tongue is made to

rest "against the end of the rod of the extractor," the other end of the lever resting "against the bottom edge of the fore end or joint of the gun." When the barrels are turned down, the extractor is pushed backwards and withdraws the spent cartridge cases.

[Printed, 8d. Drawing.]

A.D. 1866, May 29.—N° 1491.

HALL, JOSEPH.—"A new or improved kind of perforated elastic-faced cellular target."

A facing of elastic substance, such as india-rubber, is made to cover a target formed in cells. When a ball or other object is propelled against the facing it yields so as partially or wholly to admit the ball and then close upon it.

[Printed, 4d. No. Drawings.]

A.D. 1866, May 29.—N° 1501.

PAPE, WILLIAM ROCHESTER.—"Improvements in the manufacture and construction of breech-loading and other rifles and guns."

The barrels are tilted or turned down to receive the charge, and are fastened by means of "tapering or wedge bolts" or catches, which engage in recesses in the lump, and are mounted on a cross axis or spindle moved by a lever. The barrels are made with bores that gradually taper and diminish in size at the muzzle.

[Printed, 6d. Drawing.]

A.D. 1866, June 1.—N° 1531.

CAIRE, MARIUS ADRIEN.—(*A communication from William Rudolf.*)—(*Provisional protection only.*)—"Certain improvements in or connected with triggers for small arms."

The improvements are stated to consist "in attaching to the upper extremity of the trigger blade a lever or vertical arm which bears or rests against the blade in a vertical position." The trigger plate has "an enlargement underneath to serve as a box for the play of the trigger blade" or blades. The blades are pivotted "on a pin that traverses the trigger plate."

[Printed, 6d. Drawing.]

A.D. 1866, June 4.—N° 1548.

MONCRIEFF, ALEXANDER.—"Improvements in the mounting and working of ordnance."

The gun is mounted upon a gun carriage, which "is itself supported on a moving fulcrum," and to which is applied "a counterweight or spring of equivalent power, which balances the gun, so that when the gun is fired it recoils below the level of the parapet, and the force of the recoil is met and its energy stored by the counterweight or spring of equivalent power, in such a manner that the gun will again rise into firing position when required." The carriage is mounted on a rocking frame carried on two wheels or on rollers on which it can be moved to any required point. The gun being at one end of the frame is counterbalanced by a weight or its equivalent at the other end, and as the gun is depressed by the recoil the weight is raised, and on depressing the weight the gun is raised into position for being discharged.

[Printed, 8d. Drawing.]

A.D. 1866, June 5.—N° 1555.

McEVOY, CHARLES AMBROSE.—"Improvements in shells and in fuzes used with shells."

A shell is made with an internal chamber which, besides containing the bursting charge, has cavities formed in it, in which are placed small secondary shells. When the primary shell bursts the secondary shells are ejected and their time fuzes are ignited.

An impact fuze is made with a hollow plug having a tubular stem communicating with a partially spherical chamber. When the shell is fired a spherical striker which is attached by a wire is released, and on the shell impinging against an object, in any position, the fulminating composition, which is placed either upon the surface of the striker or the internal surface of the chamber, is ignited and fires the bursting charge.

A time fuze is made by placing a conical fuze tube in an outer casing. A series of holes are made in a spiral position round the fuze tube, and by turning it round to the required position the fire from the fuze composition is allowed to escape through the required hole, and so fires the bursting charge.

[Printed, 8d. Drawing.]

A.D. 1866, June 9.—N° 1585.

ERSKINE, JAMES.—(*Provisional protection only.*)—"Improvements in breech-loading guns."

The barrels, which are tilted or turned down to receive the charge, are proposed to be connected with the breech by parts so arranged that "the contact of the one part with the other, forming "an abutment or abutments," may press the undercut parts together and "hold the barrels up to the breech face, and in such "a way that the fulcrum pin is not at all depended on, and might "in fact be withdrawn at the time of firing without detriment." The fulcrum is placed at a considerable distance from the breech higher up than usual, "that is to say, nearer the line of the "bore."

[Printed, 4d. No Drawings.]

A.D. 1866, June 13.—N° 1603.

BAYLISS, SAMUEL.—(*Provisional protection only.*)—"Improve-
ments in breech-loading fire-arms."

In the top rib, between the barrels, which are tilted or turned down to receive the charge, is a cylindrical hole, in which is to be fitted a sliding stem carrying a curved projecting piece, which acts as an extractor to push out the spent cartridge case. A lever motion is to be connected with the hinge joint so as to move the extractor.

[Printed, 4d. No Drawings.]

A.D. 1866, June 14.—N° 1622.

NEWTON, WILLIAM EDWARD.—(*A communication from Philo Remington, Samuel Remington, and Eliphalet Remington.*)—

"Improvements in the construction of breech-loading fire-arms,
"so as to admit of altering guns from muzzle to breech loaders."

The breech of the barrel is closed by "a swinging breech piece," which is "swung upwards and forwards to open the bore of the "gun for the reception of the cartridge." The breech piece fit in a recess, "and has vertical joints or bearings therein. It may be "composed of two parts, one hinged to the barrel or to a band "thereon, and the other having a rising and falling motion upon "or independent of the hinged part, but also swinging with it."

A needle or striking bolt works in the breech piece. A curved piece acting as a cartridge extractor is connected with the joint of the breech piece.

[Printed, 10d. Drawing.]

A.D. 1866, June 20.—N° 1656.

TONGUE, JOHN GARRETT.—(*A communication from John Angell Wood.*)—(*Provisional protection only.*)—"Improvements in "machinery for the manufacture of metal cartridges."

Self-acting stamping machines are proposed to be used for forming by several successive operations "a seamless metallic "cartridge case." The case is to be turned in and finished by a hand-worked machine.

[Printed, 4d. No Drawings.]

A.D. 1866, June 25.—N° 1691.

SAVILLE, THOMAS PROSPER.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

Central-fire cartridges, and barrels that are tilted or turned down to receive the charge, are used. The striking bolts are to be made to work in a slanting position in the break-off, their heads being sunk in hollows formed in the rear part of the break-off. A vertical plate, attached to a horizontal rod sliding in a recess in the rib between the barrels, acts as a cartridge extractor. A second rod, working in a hole between the barrels, acts as a guide to the rod of the extractor. "A projection on the body pushes the extractor "out when the barrel is raised, and inwards on the shutting "down of the barrel."

[Printed, 4d. No Drawings.]

A.D. 1866, June 28.—N° 1721.

PLIMSOLL, HENRY DAVIDSON.—(*Provisional protection only.*)—"The application of a new material to the purpose of rendering "gunpowder non-explosive."

"Titaniferous iron sand reduced to powder" is proposed to be used as a separating material to be mixed with the grains of gunpowder, so as to render the gunpowder non-explosive. The sand may, when required, be separated from the gunpowder by magnetic attraction, and also by a sifting process.

[Printed, 4d. No Drawings.]

A.D. 1866, July 7.—N° 1793.

HARVEY, CHARLES.—"Improvements in breech-loading fire-arms."

The barrels "turn down" upon the head of the striker, a cam surface is formed, "against which a stud upon the hammer is made to bear, so as to draw back the striker the whole time it is being cocked. The hammer is also provided with a shoulder, which in firing presses against the end of the striker, and thus drives it forward in order to explode the cartridge." The striker slides in a groove formed in the lock plate, or in the breech piece, or a piece fixed to it. In some cases a cam surface may be made in a recess in the head of the striker, against which a stud on the hammer acts, or the head of the striker is made "to work in a recess formed in the hammer."

A cartridge extractor is formed by fixing "upon the axle pin, upon which the barrels move, a cam or excentric socket, which is so formed as to bear upon a small lever hinged either to the stock or to the barrel, the end of which lever is caused by the cam or excentric to press against the end of the extractor, and thus to make it protrude from the rear of the barrels as these fall forward."

[Printed, 10d. Drawing.]

A. D. 1866, July 10.—N° 1810.

CURTIS, WILLIAM JOSEPH.—"Improvements in the construction of breech-loading or repeating fire-arms."

The cartridges are contained in a magazine formed in the stock of the gun. The magazine consists "of a cylindrical revolving case" or "a fixed tube." The cartridges are moved forward by a piston worked by a lever and crank motion, and are exploded either by a needle piercer or by a pin striker. "The breech of the gun with its reinforce, and also the magazine to contain the cartridges, are placed behind the crutch or saddle, which rests on the shoulder of the soldier, so that the barrel part which extends forward will be balanced by the shorter but heavier butt end." The breech may be closed or the plunger be drawn back to admit a cartridge by hand, or by the action of the explosive force of the gas, with the addition of coiled springs suitably arranged."

[Printed, 1s. Drawing.]

A. D. 1866, July 11.—N° 1819.

HOBBS, WILLIAM. — "Improvements in ordnance whereby they are rendered more portable, and in carriages for transporting the same."

and are caused "to fall into a recess made in the cap carrier, whence they are placed on the nipple by means of the cap carrier and a small lever. A spring cover closes the extremity of the tube containing the caps, and permits of renewing the supply when they are all used." The breech is closed by means of a sliding plunger, which is drawn back to allow the cartridge to be inserted in the breech. "The bottom of the cartridge is made of india-rubber, which insures an air-tight closing." The lock is made either "with a link or with a grip" action.

[Printed, 8d. Drawings.]

A.D. 1866, July 25.—N° 1935.

VAVASSEUR, JOSIAH. — "Improvements in compressors or apparatus for receiving and absorbing the recoil of guns and other ordnance."

One or more "threaded rods or screws" is or are fixed "between and parallel to the beams or girders forming the sides of a slide on which a gun with its carriage recoils." Friction clutches or nuts are connected with the gun carriages, and work on the screws or threaded rods in such a way that their friction breaks and absorbs the force of the recoil. When the gun is run out the clutch or nut is released, so that the screw or threaded rod is free to revolve.

[Printed, 10d. Drawings.]

A.D. 1866, July 26.—N° 1940.

BONNEVILLE, HENRI ADRIEN.—(*A communication from Baron Alfred Antoine de Cantillon de Ballyhigue and Edward Cooke.*)—(*Provisional protection only.*)—"A new and improved explosive compound mixture."

Sulphate of lime and uric acid are to be mixed and "allowed to ferment during 24 hours or thereabouts, and are then put into a recipient on a furnace," to the depth of half an inch, upon "a layer of sulphate of lime about five inches thick;" heat is then applied, and the liquid evaporated and the residuum is to be granulated.

[Printed, 4d. No Drawings.]

A.D. 1866, July 28.—N° 1956.

GRIESS, PETER, and CARO, HEINRICH.—"Improvements in the preparation of bodies in which nitrogen is substituted for hydrogen."

Substances obtained "by the action of nitrous acid or amido compounds" may be used for explosive compounds. "Those obtained by the substitution of one atom of nitrogen for three atoms of hydrogen in one atom of amido compound are highly explosive, and may be applied as fulminating substances, while their products of decomposition have been found useful as coloring matters and dye stuffs." The compounds are separated from their solutions by treating them "with a mixture either of hydrochloric acid and chromic acid or with chromic acid only," so as to obtain "a crystallized precipitate consisting of a compound of hydrochloric acid and chromic acid with the nitrogenized bodies, or of compounds of the latter with chromic acid only."

[Printed, 4d. No Drawings.]

A.D. 1866, July 28.—N° 1959.

ADAMS, JOHN.—"Improvements in the construction of revolver fire-arms, and in apparatus employed in their manufacture, also in cartridges to be used therewith."

"A forging of iron or steel which has been reduced roughly to the form of the revolver, pistol, or fire-arm, with the solid frame for the revolving cylinder," is first bored, and then subjected to the successive operations of a series of tools, and shaped by revolving cutters. A lever rammer is applied beneath the barrel. Cartridges carrying their own means of ignition are so made that they may be "loaded at the muzzle of the cylinder instead of at the breech." The charge chamber is made with a shoulder against which the base of the bullet rests, while the powder charge enters a chamber of smaller diameter. The spent cartridge case is pushed out "by a bolt fixed to the frame at the breech end of the cylinder," which may also be used as a locking bolt. The cartridge is fired by striking the cap fixed in its base by a hammer whose nose passes through a hole bored in the breech end of the chamber.

[Printed, 2s. 10d. Drawings.]

A.D. 1866, July 28.—N° 1960.

RICHARDS, WESTLEY. — "Improvements in breech-loading fire-arms."

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The improvements are based upon those described in the Specification of prior Letters Patent, dated March 25, 1858, N° 633. The breech is closed by a breech block, which is connected with and slides on the under side of a lid that covers the charge chamber or box formed in the rear of the barrel. The lid is raised by a lever tail piece which lies upon the top of the stock. To the "under side of the lever, at a short distance in rear of the sliding breech block, a wedge-shaped piece is hinged," which serves as a rear abutment to the sliding block, and wedges it tightly against the rear of the barrel. Two wedge pieces may be used, one being hinged to the bottom of the chamber. The wedge pieces may be cut away in the centre part to facilitate the insertion of the cartridges. Combined with the sliding breech block is "a striker that moves parallel with the axis of the barrel." When central-fire cartridges are used the striker is made with a flat face arranged to come against a stop so that it is "flush with the surface of the block" when not forced forward. When the cartridge is fired the striker is "forced back by the cap until its rear end bears against its stop," in which case a spring is not required to force back the striker. When the barrels are turned down or tilted to receive the charge, the strikers "move parallel with the axis of the barrels." The neck of the hammer is made "to strike a driver piece which passes down obliquely to the striker" which has "a notch formed in its upper side at a point intermediate of its length." The lower end of the driver piece acts "on the forward end of the notch," and forces it forward and explodes the cap. When required, the nose of the hammer may be made to discharge pin cartridges.

[Printed, *See* Drawing.]

A.D. 1866, August 1.—N° 1976.

STOKES, WILLIAM, and FAULKNER, CHARLES.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

The breech is to be closed by a sliding plunger, which is fastened by engaging a projection formed upon it in a transverse slot. The striker is made to work in the plunger. To the rear end of the projectile is attached a stem, which may be formed with a cup in which is placed the percussion composition, or it may be made to serve as an anvil to the percussion cap.

[Printed, *See* No Drawings.]

A.D. 1866, August 2.—N° 1996.

NEWTON, WILLIAM EDWARD.—(*A communication from John Ericsson.*)—"Improvements in the construction of ordnance."

A "central core or barrel" is made of wrought iron or steel, its exterior "is so turned as to present the form of a series of "cylinders of slightly varying diameters," affording a stepped surface. "Bands, rings, or hoops made of rolled iron plate, "such as is commonly known as boiler plate," are fitted and forced upon the tube, and are "confined between two heavy "forged wrought-iron rings or collars."

[Printed, 107. Drawing.]

A.D. 1866, August 4.—N° 2016.

WILSON, THOMAS.—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms, and in "converting muzzle-loading fire-arms into breech-loading fire-arms."

Several modifications of breech-loading and discharging "actions" are described. To the breech end of the barrel is attached "a metal frame," which "encircles the butt of the stock, "and is constructed so as to carry the entire mechanism required "for operating and firing the gun." The breech is closed by a block attached to a lever which lies on the top of the stock. In the body of the breech frame is fitted a sliding rod parallel to the axis of the bore, and actuated by a coiled spring which "serves as "a hammer;" a projection upon it moves the pin striker which is contained in the breech block; the spent cartridge case is withdrawn by a hooked extractor. Instead of a sliding rod or hammer "a cranked or curved hammer" may be used. In some cases the breech is closed by a block hinged "to the forward end of a "sliding closer." In some cases "tubular closing blocks are "used." The needles of needle guns may be made "three-square or triangular in cross section." Self-igniting cartridges are made with a metal case "fixed to the cap or base or ferrule," and the case is "closed by means of a wedge closing piece carrying the anvil and percussion cap." The closing piece and anvil tube are made in one piece. The anvils may be made tubular. A self-igniting cartridge may be made with "a small "charged rim percussion cap fixed in the base." A metal disc may be fixed in the cap or base of the cartridge "having a

"projecting anvil upon it" for discharging the percussion cap.

[Printed, 4s. Drawings.]

A.D. 1866, August 7.—N° 2035.

McEVOY, CHARLES AMBROSE.—"Improvements in torpedoes or submarine explosive instruments."

The bursting charge is placed in a suitable metallic vessel, "mounted on a bar or bracket. Carried by the powder case is a hammer furnished with a spring;" the hammer "is held back by a detent, which is kept up to the hammer by a filling piece or block on which the tail of the detent rests." Vanes are attached to the filling piece, and when the torpedo is allowed to float, and its motion is arrested by any object, the action of the water upon the vanes causes the filling piece to "screw itself endways on the bar," and when it passes from under the tail of the detent, the hammer falls on a percussion cap, and ignites the bursting charge. A fuze is made by attaching to a tube, containing the fuze composition, a cap or dome, made of thin sheet metal. When the dome is crushed in by an object impinging upon it a striker is made to ignite a patch of percussion composition placed in contact with the fuze composition. A torpedo that is anchored in water, and discharged by a vessel passing over it, is fired by a friction fuze; "the wire of this fuze passes through a diaphragm of thin metal soldered all round its edge to the plug of the fuze;" the wire is soldered to the centre of the diaphragm, so that "the wire may be pulled and the charge exploded before the joints are broken." To the wire is attached one end of a chain, which at the other end is "attached to a weight in the form of a cover lodged on the top of the case." When the cover is disposed by a passing vessel the wire is pulled and the torpedo discharged.

[Printed, 10d. Drawing.]

A.D. 1866, August 10.—N° 2058.

WILLIAMS, LEWIS EDWARD.—"Improvements in explosive shells."

A shell is "constructed in one or more central or radial chambers, dividing the shell into sections, and other chambers, one in each section, each having an aperture for charging, in

"which fuzes are inserted." When the shell is fired the fuzes are so arranged that the sections are burst separately, "producing a number of separate explosions," the lengths of the fuzes being regulated accordingly. In some cases the explosions may be timed to take place simultaneously, by making the fuzes communicating with the respective sections of equal lengths.

[Printed, 8d. Drawing.]

A.D. 1866, August 10.—N° 2061.

RENDEL, GEORGE WIGHTWICK.—(*Provisional protection only.*)
—"Improvements in the manufacture of coiled iron tubes or cylinders used in the construction of cannon."

Tubes or cylinders intended to be used in constructing guns are proposed to be rolled in a manner "similar to that now in use for rolling wheel tyres." The coiled bar is welded "into a continuous cylinder under a steam hammer, or by any other process now in use." It is then heated and rolled. "The rolling apparatus consists of two main rollers in connection with one or more main guide rollers. The coil is put over one of these main rollers, one or both the bearings of which are temporarily withdrawn to allow of this being done. The rollers are so arranged that they may be gradually approached to each other, so as to roll out the sides of the cylinder, the circular form being maintained by the guide roller or rollers." The rollers may be driven directly by a steam engine, "or by water pressure generated by a steam engine and accumulated by an apparatus known as an accumulator. In the latter case the pressure would be applied either by a hydraulic engine or by a hydraulic press with reciprocating action."

[Printed, 4d. No Drawings.]

A.D. 1866, August 11.—N° 2065.

CRAIG, HENRY GRIFFITH.—"An improved needle gun."

The breech end of the barrel is closed by a screwed plug. An opening is made in the side of the barrel to allow the cartridge to be inserted. A tubular cover of a conical shape is fitted on to the rear end of the barrel. The needle action is contained in a "ram" or sliding tube. When the charge is inserted the tubular cover is pushed forward on the rear of the barrel, so as to cover the opening in its side. The needle is driven forward and

works through holes made in the cover and breech plug of the barrel.

[Printed, *ed.* Drawing.]

A.D. 1866, August 13.—N° 2073.

NEWTON, WILLIAM EDWARD.—(*A communication from Alexander James Bergen.*)—"Improvements in breech-loading fire-arms."

The improvements are based upon those described in the Specification of prior Letters Patent, dated Aug. 22, 1862, N° 2349. The breech end of the barrel is closed by a block "sliding longitudinally" in connection with "a rear one sliding transversely," which passes in behind and supports the rear of the front block. The blocks are worked by a lever motion. The pin on which the lever turns works in a slot. Spring catches placed at the side of the forward block act as an extractor to grip and withdraw the base of the spent cartridge case, and a finger on the end of the lever rises and pushes out the cartridge case from between the spring catches. "The cartridge when dropped into the breech rests upon ledges, and is slid forward into the rear end of the barrel."

[Printed, *ed.* Drawing.]

A.D. 1866, August 17.—N° 2113.

TRANter, WILLIAM.—"Improvements in fire-arms."

The improvements are based upon those described in the Specification of prior Letters Patent, dated July 20, 1865, N° 1889. The breech is closed by a plunger or breech block, which slides horizontally in a case in the rear of the barrel; it has connected with it a cartridge extractor, which has "two springs or lugs intended to take hold of the hinder part of the cartridge case." In connexion with the extractor a lever, called "a thrower," is worked by "a projection on the plunger," and is made to raise and "throw out the cartridge case." The fulcrum of the lever used "for fixing the barrel" is placed "at the upper part of the slot in which it works," the lever being made to take "into a notch formed in the block fixed to the barrel, for the purpose of fixing the barrel firmly to the frame." The striking pin used for igniting central-fire cartridges is made to work "in a curvilinear instead of a straight line as usual, and moving in a

"curvilinear slot in the breech piece." A "lifting catch, having a hook on the end acting in a slot formed in the hammer," is combined with a catch "placed at the top of the slot in the body." The hook acts "underneath the sear for the purpose of releasing it from the catch in the hammer."

[Printed, 1s. 2d. Drawings.]

A.D. 1866, August 18.—No 2124.

SCOTT, ROBERT ANTHONY EDWARDS.—"Improvements in the manufacture of hollow projectiles."

Hollow projectiles are made by cutting the required short lengths from "a steel or metal tube, which is drawn in the ordinary way, but with projecting feathers ribs or flangers thereon, which correspond with and are intended to fit or run in the grooves of the rifled gun." The front and rear parts of the projectile are made separately and are attached to the body of the projectile by screws, or by welding or brazing them.

[Printed, 4d. No Drawings.]

A.D. 1866, August 18.—No 2126.

ABRAHAM, JOHN.—(*Provisional protection only.*)—"Improvements in the manufacture of central-fire cartridges for breech-loading fire-arms."

The cartridge is proposed to be made with a tubular case and cup-shaped base made in one piece out of a sheet of metal "by the process of raising in dies." The sheet is made in the shape of a disc, and passed through a series of "properly shaped dies."

[Printed, 4d. No Drawings.]

A.D. 1866, August 20.—No 2133.

WELDON, WALTER.—"Improvements in the construction of ordnance, partly applicable also to other purposes."

The gun is constructed of "long narrow plates of steel or wrought iron" fitted segmentally, so as to form the tube or barrel. Discs, rings, or washers, which may be cut out of sheet metal, are forced upon the segmental pieces and hold them together. If necessary, a thin "tubular skin" may be inserted in the barrel as a lining.

[Printed, 4d. No Drawings.]

A.D. 1866, August 20.—N° 2135.

DARBY, JOHN.—(*Provisional protection only.*)—"Improvements in fire-arms of all calibre, and for the conversion of muzzle-loading guns to breech-loading guns."

The breech of the barrel is to be closed by a sliding breech-piece consisting of a tubular piece in which is fitted a solid cylinder working on "a ball piece acting as a loose joint." The solid cylinder "when shut down" may be "turned round in the barrel" and thus lock itself in." A needle striker is made to work in the breech piece.

[Printed, 4d. No Drawings.]

A.D. 1866, August 20.—N° 2139.

SCOTT, ROBERT ANTHONY EDWARDS.—"An improved method or apparatus for manœuvring guns."

Guns are so mounted that they can be "trained to fire through portholes or embrasures at widely different angles . . . by bringing the rear end of the platform or slide on which the gun is placed, over a turntable." The rear end may then "be turned round with facility, the gun being run back so that most of the weight will rest on the turntable." The racers on which the slide moves "are curved as usual," but the rear racers "are divided so that a portion or arc is fixed on the face of the turntable," which can be brought round as required according to the direction in which the gun is to be trained. In some cases "the turntable may be placed between the two racers, so that the rear racers will be entirely fixed and undivided." The gun may be trained by a chain "passed round sheaves and against metal or other curves fixed on the deck;" an adjusting screw may be used with the sheave "for tightening the chain when necessary."

[Printed, 10d. Drawing.]

A.D. 1866, August 21.—N° 2143.

ISHERWOOD, JAMES CLARENDON RAMSBOTTOM, and WARRY, ROBERT.—"Improvements in breech-loading fire-arms, and in cartridges for the same."

In the rear of the barrel is formed a chamber to receive "the needle-case, which is hinged to the side thereof." The needle is carried by a block which is moved by means of a lever connected

with a wedge piece which is struck by the hammer. The needle block is pushed back by the action of a spiral spring. "Any convenient form of extractor" may be used.

The cartridge is formed of a tubular case closed at the end "by a cap formed with a flange," and having a nipple or projection in the centre on which the "percussion cap or friction powder" is placed. Over the cap is placed a wad "formed with a recess to fit over the percussion cap." When the cartridge is fired the case is driven out, leaving the wad and cap, which are pushed forward by the next cartridge and serve to lubricate the barrel.

[Printed, 10d. Drawing.]

A.D. 1866, August 21.—N° 2146.

WHITWORTH, JOSEPH. — "Improvements in cartridges for ordnance."

The powder charge of the cartridge is made up in such a way that "a cylindrical hole or hollow space" is left in its interior, in which is inserted a small subsidiary charge, "which may be of powder or gun-cotton." The interior hollow space may be formed by placing in the centre of the powder charge a tube of thin copper or other material. The subsidiary charge may be ignited through a touch-hole at the end or the side of the cartridge; it starts the projectile, and also effects complete ignition of the large powder charge, the strain of whose explosion is distributed over a large surface of the barrel, owing to the elongated form in which the powder is made up.

[Printed, 10d. Drawing.]

A.D. 1866, August 23.—No. 2159.

MAIN, STEPHEN AMOS.—(*A communication from Charles Howard.*) — "Improvements in breech-loading and other fire-arms, and in bayonets for the same."

An enlarged receiving or charge chamber is formed in the rear of the barrel, and "a longitudinal slot is formed through the barrel on the under side of the chamber," to provide for the insertion and emission of the cartridge and cartridge case. The breech is closed by a sliding breech block containing a striker actuated by a spring. The breech block is moved by a lever trigger guard. The spent cartridge case is pushed out by a sliding extractor connected with the breech block. A bayonet is made

" of a tube which at one end fits on the cylindrical end of the
 " barrel, and at the other is tapered to a point to form the bayonet
 " blade." It is fastened " by means of an open spring ring."

[Printed, 1s. 4d. Drawings.]

A.D. 1866, August 25.—N° 2187.

NEWTON, WILLIAM EDWARD.—(*A communication from Thomas Jefferson Vail.*)—"Improvements in breech-loading fire-arms."

The breech is closed by a "swinging breech block," which works on a part of the breech frame made of "a cam-shaped form." When swung to the left the block has an "oblique rearward motion," and opens the cartridge chamber; when it is swung to the right, it moves obliquely-forward and closes the chamber. When the breech block is moved to the rear a "cartridge ejector," connected with it, "follows but with a more rapid movement." The nose and heel of the hammer enter "into recesses made respectively in the block and frame," and aid in holding the parts firmly. The breech block and hammer have their surfaces roughened at the parts where they would strike, if the hammer were accidentally let down on the block when swung open, to prevent accidental discharge.

[Printed, 8d. Drawing.]

A.D. 1866, August 25.—N° 2196.

BROOKS, EDGAR.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

The barrels are proposed to be made to turn "on an axis parallel with the axes of the barrels," the front end being smaller than "the hinder and screwed part of the said axis." Screw threads are made on the axis and in the lump to effect the fastening of the barrels. The cartridge is to be made with the shot charge enclosed in a bag of paper "converted" into gun cotton.

[Printed, 4d. No Drawings.]

A.D. 1866, August 27.—N° 2205.

KRUTZSCH, WILLIAM.—"Improvements in the construction and combination of breech-loading and repeating fire-arms and ordnance, and in the cartridges for use in the same."

The breech is closed by means of blocks called "sector" pieces; the outer piece slides round and is "hooked together as it were" to the inner piece. The sectors are bored with holes, and when they are brought into line the breech is opened, by turning the outer sector partially round the breech is closed. A spring striker is used to ignite cartridges containing their own ignition. A hooked cartridge extractor is used. Cartridges are supplied to the charge chamber by a self-acting tubular magazine without "taking the gun from the shoulder after firing." For breech-loading ordnance cartridges made like those used for the service with the Snider gun may be used, "a thin metallic plate" being placed over the ignition opening, which is thereby "closed entirely" when the explosion takes place.

[Printed, 1s. Drawing.]

A.D. 1866, August 28.—No 2209.

BARBER, THOMAS WALTER, and BARBER, WILLIAM.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms."

The breech of the gun is proposed to be fitted with a sliding breech block working vertically in a recess and moved by a lever motion connected with the hammer. "By drawing back the hammer the levers and breech-piece are depressed and the end of the barrel opened, and vice versa." In some cases the "breech piece is hinged behind the barrel." Or a sliding plug actuated by a spiral spring and working in a breech case is connected with the breech block, so that by drawing back the plug the breech block is depressed. The plug is made to strike the cartridge "through a hole in the breech block."

[Printed, 4d. No Drawings.]

A.D. 1866, August 28.—No 2213. (* *)

FOSTER, JOHN, the younger.—"Improvements in machinery for the manufacture of spool tubes and cartridge cases."

This invention consists of improvements in the machinery for making spool tubes and similar articles for which Letters Patent were granted to William Hirst on the 19th of September, 1862, No. 2481, and on the 6th of May, 1864, No. 1148, in which machinery paper is fed from a creel or roller, and cut into suitable lengths or shapes by cutting instruments arranged for the

purpose, such lengths of paper being then moved forward by travelling bands under an endless travelling cloth, which is supplied with paste from a hopper, and then wound upon a rotary pin or spindle by means of a brush, the tube or case thus formed being then pushed off the pin by a slidable collar, the Specification of the last Patent mentioned above describing an improvement upon the first invention, as consisting in the use of two pins instead of one only, these pins meeting end to end in the middle of the tube, and being withdrawn from each other when it is requisite to release the tube; and also another improvement as consisting in a peculiar construction of hopper for the paste.

The present patentee states that he has found such machinery liable to various defects, one of these arising from the pasting apparatus frequently failing to act with efficiency, and another from the liability of the lengths of paper to swerve from the right line of travel, in passing through the pasting apparatus, and thus to fail to be presented properly to the pin or spindle on which they are to be wound. To remedy these defects he shortens the pasting cloth, or the distance travelled by the papers under such cloth, and introduces additional rollers to support the papers and press the cloth thereon, at such distances from each other that the papers, after being cut to the required length, do not leave one pair of rollers until they have reached the next pair, such rollers also serving the purpose of effecting a more uniform and thorough pasting of the papers. He also uses, instead of the travelling bands, parallel wires or bars, which are supported in grooves in the rollers, and form a bed or guide for the papers to pass over. A variable and intermittent motion is also given to the cutting apparatus, and an intermittent motion to the pasting apparatus, in such manner as to allow sufficient time for the removal of a complete tube from the spindle before the next piece of paper is presented thereto, the variable motion being obtained by the use of eccentric wheels, and the intermittent motion by leaving a blank space in one part of the gearing by which the pasting apparatus is driven; or these effects being produced by other suitable mechanical means. Endless bands conduct the tubes from the spindle to a suitable receptacle, and a rotary brush running in a vessel of water cleanses them from paste. And change wheels are also provided for the purpose of cutting the papers to different lengths, and varying the rotation of the spindle or pins as may

be requisite, the paste hopper or vessel being provided with adjusting screws, by which the quantity of paste flowing therefrom may be varied.

These improvements are all fully set forth and illustrated by Drawings annexed to the Specification.

[Printed, 2s. 10d. Drawings.]

A.D. 1866, August 28.—N° 2215.

NEWTON, WILLIAM EDWARD.—(*A communication from Barton Howard Jenks.*)—"An improved mode of preventing oxidation of lead balls in fixed ammunition."

To prevent the oxydation of leaden bullets or other balls used in making up ammunition, the bullets or balls are "coated with a solution that will form a film, which will be a non-conductor of electricity."

Silicate of soda "will answer the purpose," or shellac or gum sandaric or other gums or resins may be used. Leaden bullets may be coated with copper.

[Printed, 4d. No Drawings.]

A.D. 1866, August 29.—N° 2222.

ELEY, WILLIAM THOMAS.—"Improvements in machinery employed in the manufacture of 'Boxer' or other central-fire cartridge cases."

Self-acting machinery is used for making cartridge cases. Suitable dies and punches are arranged in combination with a rotating table mounted on a frame and driven by steam power or other power with a step-by-step motion, so as to bring each die and punch in succession under a moveable plunger and anvil connected to the main framing of the machine.

The cartridge case, having in it a block of paper for base and a cap chamber, is placed in a die and is brought under the anvil. Each die "has a punch always in it upon which the cartridge case is stamped" by the punch being forced upwards, and the compressed cartridge case is then pushed upwards from the die. A mandril is caused "to pass down through the plunger and anvil into the cap chamber to maintain its correct size immediately after the face of the anvil has descended on to the top of the hollow die." The mandril is withdrawn before the face of the anvil rises.

[Printed, 1s. 2d. Drawings.]

A.D. 1866, August 29.—N° 2224.

HUGHES, EDWARD THOMAS.—(*A communication from Oliver Fisher Winchester.*)—"Improvements in repeating fire-arms."

Metallic cartridges are employed, they are placed in a self-feeding tubular magazine "beneath the barrel of the arm and "carried therefrom to the barrel by the movement of the trigger "guard." A carrier block which receives the cartridge from the magazine raises it for insertion into the barrel and afterwards throws the discharged cartridge case from the arm. In some cases the spent cartridge case is withdrawn by a hook extractor connected with the carrier block.

[Printed, 2s. Drawings.]

A.D. 1866, August 29.—N° 2227.

TURNER, THOMAS, junior, and SIDDONS, WILLIAM, junior.—"An improved cartridge or cartridge case extractor for breech-loading guns."

The barrels are tilted or turned down to receive the cartridges, which are made with metallic bases provided with flanges. The cartridge extractor consists of a curved projecting piece attached to sliding bars or "guides" on each side of the lump beneath the barrels. A slot is made "in the forward part of the cartridge or "cartridge case extractor, into or against which a projection "works, formed with or secured to the part technically known "as the body of the gun." When the barrels are turned down the projection acts upon the extractor and causes it to push out the flanged bases of the spent cartridge cases.

[Printed, 8s. Drawing.]

A.D. 1866, August 29.—N° 2231.

NEWTON, WILLIAM EDWARD.—(*A communication from Barton Howard Jenks.*)—"Improvements in breech-loading fire-arms."

Cartridges "having the percussion powder confined within "flanges which are formed round the butts of the shells" are employed. The breech is closed by "a vibrating breech closer" consisting of a breech block, which works on a horizontal axis placed below the breech end of the barrel and at right angles to its axis. "A vibrating locking latch and brace" keep the breech block "firmly against the end of the barrel. "A vibrating "hammer" is applied "on one side and outside of the breech

" closer " in such a way that it is cocked when the breech closer is drawn back, and when the latter is pushed home so as to close the breech, the hammer is in position for discharging the piece. The breech closer is locked in its place by a " vibrating latch " so arranged that the hammer cannot operate unless the latch is properly in its place.

[Printed, 1s. Drawing.]

A.D. 1866, August 30.—N^o 2243.

ALBINI, AUGUSTO, and BRAENDLIN, FRANCIS AUGUSTUS.—(*Provisional protection only*).—" Improvements in breech-loading fire-arms."

The breech end of the barrel is closed by a breech block " hinged to the top or side of the barrel," it is proposed to fasten the block when in its place by means of a bolt " passing through an opening in the rear of the breech chamber." The bolt works in a line with a pin striker which is fitted in the hinged breech block. The rear end of the bolt is connected with and moved by the action of the hammer. Cartridges having " expanded bases " may be used which enable the spent cartridge cases to be removed by hand.

[Printed, 4d. No Drawings.]

A.D. 1866, September 3.—N^o 2265.

HADDAN, JOHN COOPE.—(*Provisional protection only*).—" Improvements in carriages for field artillery."

The limber of the gun carriage is proposed to be made with a bracket, consisting " of two main curved arms fixed to the transom " or axis. The trail of the gun carriage is to be attached to the bracket instead of being connected to it by " a hook or pintle " in the usual way.

[Printed, 4d. No Drawings.]

A.D. 1866, September 3.—N^o 2267.

RUSS, EDWIN, HAMMOND, HENRY, and HAMMOND, EDWIN.—" Improvements in fire-arms."

To the rear of the breech end of the barrel is attached a trough shaped metal plate or breech case, to one side of which is hinged a breech block or plug. " The rear end of the plug has inserted in it a

" cam, lug, or tumbler receiving motion from a lever on the top and
 " outside of the said plug; this cam or lug, when the breech is
 " locked, enters an aperture or slight cavity formed in the rear end
 " of the metal bed plate, while the forward end of the plug enters
 " a recess formed or cut in the forward end of the metal plate."
 Central-fire metallic cartridges are discharged by a pin striker or
 needle working in the breech plug. "The cartridge is withdrawn
 " by an extractor which slides at the side of the arm in front of
 " the breech plug, a spring forcing it back as the breech is opened,
 " and consequently driving the expanded cartridge case out."

[Printed, 10d. Drawing.]

A.D. 1866, September 4.—N° 2272.

REEVES, CHARLES.—"Improvements in cartridge case extractors for breech-loading fire-arms."

The cartridge extractor consists "of a square or cylindrical
 " rod having a cross piece or hook on its end." It is applied to
 a breech which is closed by a block hinged to the side of the
 barrel, and may be applied to other breech closers. The rod slides
 in a recess made at the breech end of the barrel, and the cross
 piece is made to lie flush with the end of the barrel. The extractor
 is moved by means of a "bent lever situated on the side of the
 "gun." The short arm of the lever is connected with the rod
 of the extractor, "the long arm of the lever is made into a
 "handle," and by depressing it the spent cartridge case is
 pushed out.

[Printed, 8d. Drawing.]

A.D. 1866, September 5.—N° 2279.

LEETCH, JAMES.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A slot is proposed to be made in the breech end of the
 barrel, into which is fitted "a top piece" or moveable block,
 having at its front end "a moveable jointed cone, to which is
 "attached a rim forming about a half circle." The base of the
 cartridge falls into the rim, and "the top piece is then pushed
 "forward" and closes the breech, being fastened in position "by
 "a self-acting bolt." When the top piece is drawn back
 after the piece is fired it withdraws the spent cartridge case.

[Printed, 4d. No Drawings.]

A.D. 1866, September 6.—N° 2287.

BARDELL, WILLIAM POOLE, and POWELL, WILLIAM.—
“Improvements in gun and pistol locks.”

The lock is made with a sear spring “larger and stronger than the ordinary spring.” The lower end of the spring bears upon the sear in the ordinary way, the upper end bears on the long arm of a lever whose short arm engages in a notch in the tumbler in such a way as to act against the mainspring and keep it in equilibrium at half cock. When the hammer is let fall from full cock the momentum acquired causes it to strike the nipple or percussion cap, and the action of the sear spring causes it to come back to half cock, in which position the hammer is then held.

[Printed, 8d. Drawing.]

A.D. 1866, September 6.—N° 2293.

FOSBERY, GEORGE VINCENT.—“Improvements in the lock and other parts of breech-loading fire-arms, and in cartridges and projectiles for the same.”

The breech end of the barrel is closed by a breech piece “constructed to act as a lid or door.” The breech piece turns on a horizontal fulcrum pin fixed below the bore of the barrel and at right angles to it. To the top of the breech piece is attached a link or swivel which turns on a pin fixed in the breech piece; the tail end of the link rests, when the breech is closed, in a recess formed in the shoe or breech frame, and affords an abutment to support the breech piece. A needle or striker slides in a hole made in the breech piece. To enable the cartridge to be inserted in the barrel, the tail end of the link is raised from the recess and the breech piece is turned down upon its axis so as to bring it from the vertical into a horizontal position; when the cartridge is inserted the breech piece is pushed up by the action of the link or swivel piece and closes the breech. An extractor hook which is connected by “rods or links” to the piece is used to withdraw the spent cartridge case. A central-fire cartridge is made with a base “strengthened by an inner skin or case of metal,” which “need occupy only a short portion of the entire length of the outer case.” The bullet is made with “grooves or channels around its periphery,” and has above and below the grooves, “projecting collars or rings,” the grooves are filled with lubricating material.

[Printed, 1s. 6d. Drawings.]

P. A.

L. L.

A.D. 1866, September 7.—N^o 2304.

BROOMAN, CLINTON EDGUMBE.—(*A communication from Antoine Alphonse Chassepot.*)—"Improvements in breech-loading fire-arms and in the manufacture of cartridges to be used therewith."

The breech is closed by a sliding bolt which works in a breech frame and carries a needle striker which ignites the cartridge priming. The "hermetic closing" of the breech is effected by placing a "vulcanised caoutchouc washer" in front of the breech bolt, "between its front face and a flange or shoulder on the needle guide, which is moveable." The breech bolt has a projecting handle, by means of which it is drawn back, the cartridge is pushed into the breech end of the barrel, and the breech bolt is then pushed back into its place and locked by partially turning it by means of its handle. The needle is actuated by a coiled spring, and is held back by "a lever and a follower or catch, connected by a pin or screw and acted upon by a spring pressing on the upper part of the lever." The lever, when acted upon by the trigger releases the parts and allows the coiled spring to propel the needle forward, through the needle guide and caoutchouc washer, until it strikes the rear end of the cartridge and ignites the charge. A projecting piece is placed in front of the needle guide to effect "the expulsion and combustion of the paper residues remaining in the barrel after the discharge." The cartridge priming "consists of a copper cap like an ordinary military cap, but of smaller dimensions; it is formed at the bottom with two holes diametrically opposite to each other for giving passage to the spark." The cap is supported in a thin washer which forms the base of the cartridge, and is covered with a "small plug of cloth or wax" to protect it from outward blows.

[Printed, Is. Drawing.]

A.D. 1866, September 10.—N^o 2326.

HARLOW, EDMUND.—"Improvements in breech-loading fire-arms and in revolving fire-arms, and in cartridges for the said fire-arms."

The barrels of "drop down guns" are locked when in position by a screw action worked by a lever, so as to "screw and wedge the ends of the barrels into the cavities in the break-off." When a fixed barrel is used a slot or hole is made "in the top of the barrel,

"for the insertion of the cartridge," and is closed by a compound breech block, worked by a lever motion, the lever lying along the strap or tang of the gun."

A spring "cartridge extractor" is fitted "at the end of the rib," or upon "the lump" in the case of drop-down barrels, and when the barrels are raised the spring becomes free to act, and pushes out the spent cartridge cases.

The revolving chamber of a revolver pistol or gun is made "in the form of a series of equal planes," in the case of a chamber having six barrels, for example, "in the form of a hexagon," the planes are acted upon by a lever worked by the hammer or trigger of the lock. A cartridge case is made by bending a piece of thin sheet metal into a tubular form and fitting "a washer or cup in the inside of the case." The cap is fitted "on the outside of the case in the usual manner." A cheap military cartridge is made with a base formed by fixing a felt wad to a washer, and piercing a hole through them in which the cap is placed. The residue of the cartridge is blown out by the succeeding charge. Cartridges may be made with a metal case or tube attached to the bullet, which is carried away with the bullet at each discharge.

[Printed, 1s. 8d. Drawings.]

A.D. 1866, September 10.—N° 2328.

SCOTT, ROBERT ANTHONY EDWARDS.—(*Provisional protection only.*)—"Improvements in gun carriages, and in the mode of elevating and depressing guns."

A compound or double gun carriage is proposed to be used. It consists of "an inner carriage pivoting upon a strong bolt or fastening on the front of an outer carriage." The inner carriage may be "of a single plate or of the box girder construction," and may be worked by a rack with gearing. It may be secured "by means of powerful clamps or compressors" to the outer carriage. A double carriage is also proposed to be made with the centre carriage "secured by strong transoms running across it" in such a way that it may be raised or lowered by screws or other suitable means.

[Printed, 3d. No Drawings.]

A.D. 1866, September 11.—N° 2337.

SCOTT, ROBERT ANTHONY EDWARDS.—"Improvements in the mode of mounting and working revolving and other guns."

L. L. 2

Heavy revolving or pivoting ship guns are worked on slides "secured or held down to the deck by means of friction rollers by plain blocks working in grooves or under projections either on the racers or on the deck, or on the sides of the ship, so that the slides and their guns may with safety and facility be shifted to work round, or partly round various centres according to the direction or line which it is desired to fire."

A moveable "mantelet or bullet proof protection" is employed to cover the men while they are working the guns.

An upper or main deck gun is worked "by means of racers or slotways, on or in the deck, and of rollers or trucks fitted to the gun slide so as to readily turn or be turned round on a vertical pivot in the required directions for transporting, training, & traversing the gun."

A bolt or block is fitted "to the front or rear of the slide, or to both the front and rear, so as to readily drop into a circular slotway or groove, or under a projecting flange," so as to hold the slides securely and firmly. Toothed racks may be fixed "upon the sides, decks, or slides of vessels for the purpose of transporting or traversing the guns, or they may be affixed to turntables."

[Printed, 8d. Drawing.]

A.D. 1866, September 20.—N^o 2417.

CARTER, HENRY, and EDWARDS, GEORGE HENRY.—"Improvements in breech-loading fire-arms."

The breech is closed by a breech plug which is made to slide in a cylindrical chamber in the rear of the barrel, and is moved by a "hand lever" which projects through an opening in the top of the chamber. The plug is made in two parts, "which abut end to end in the form of a screw, so that if one be partially rotated and the other stationary, they will recede a little from each other; the striker rod for central-fire cartridges is fixed to the rear or short part of the plug," and passes through a hole in the front part. A small rod lies in a groove below the breech chamber, and has a hooked end which acts as a cartridge extractor. When the breech plug is drawn back it moves the rod and extracts the spent cartridge case, which "receives a sharp blow underneath from a pin mounted on a spring, entering through a hole in the under part of the cylinder, which throws it out of the cavity in the cylinder."

[Printed, 1s. 8d. Drawings.]

A.D. 1866, September 21.—N° 2424.

STUART, GRAHAM.—“Improvements in breech-loading guns.”

In the rear face of the barrel of the gun “a spherical concavity “is formed.” Against its surface is fitted a spherical breech block, mounted on an axis supported by trunnions which are carried on bearings attached to the barrel. The breech piece is bored so that its opening can be turned in a line with the bore of the barrel, or the breech piece can be turned so as to close the breech end of the barrel. The breech piece is slightly eccentric to its trunnions, so as to press its surface tightly against that of the breech end of the gun. A cam-shaped breech piece can be used with a partly spherical cavity formed in the rear face of the gun.

[Printed, 2s. 4d. Drawings.]

A.D. 1866, October 2.—N° 2530.

BERNEY, THOMAS.—“Improvements in the construction and “use of projectiles and ordnance, and other arms.”

Projectiles are made by casting them in suitable moulds, in which are previously placed bands of wrought iron or steel, which it is intended to combine with the cast body of the projectile. Steel fronts may be fixed on the projectiles. For effecting penetration through armour plates the front of the projectile may be made to consist of cones or conoidal figures, “surrounding a central “figure wholly or in part.” A breech loading gun is made with “a conical recess or chamber in the breech end of the piece. In this recess is fitted a charging instrument made of “sterro metal,” and containing the charge of the gun. The “sterro-metal” is composed of copper, 55·04 parts; zinc, 42·36 parts; iron, 1·77 parts; tin, 0·83 parts. The gun is covered with a coating of lead, which may also be covered with a coating of vulcanised india-rubber so as to prevent the effects of vibration on the parts.

[Printed, 10d. Drawing.]

A.D. 1866, October 3.—N° 2544.

WILSON, THOMAS.—(*Provisional protection only.*)—“Improvements in the manufacture and construction of breech-loading “fire-arms.”

The breech frame or shoe attached to the barrel of the gun is proposed to be made by casting it of “cast steel, homogeneous

"iron or malleable iron." The breech block is cast in the same way. The tube for containing the spring which actuates the cartridge extractor, which may be made of "flat steel," is enclosed in a receptacle made solid with the block. The extractor is attached to the block by means of a tubular pin.

[Printed, 4d. No Drawings.]

A.D. 1866, October 6.—N° 2580.

POPPENBURG, JOHANN VON DER.—"Improvements in breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

The breech is closed by a block, which is hinged to the top of the rear end of the barrel, and is fastened when in its place by a sliding bolt, which engages in an opening in the rear of the charge chamber. A safety catch is connected with the hinged block, and so arranged that it prevents the hammer from falling when the breech block is not in its place. The lump on the top of the barrel to which the breech block is hinged is made of a separate piece, and is attached to the barrel by screws and solder. A cartridge is made with a metallic base or cap, "without a rim or flange," a tube or case of linen or other fabric being attached to the cap in the usual manner. A cartridge extractor, consisting of "a flat bar or rod, capable of sliding in a recess in the block," is used to push out, the spent cartridge case being connected with the breech block in such a way that when it is raised the extractor pushes out the cartridge case.

[Printed, 10d. Drawing.]

A.D. 1866, October 8.—N° 2589.

CLARK, WILLIAM.—(*A communication from Jules Félix Gévelot.*)—"Improvements in central-fire percussion cartridges."

The cap is placed in the centre of a base of paper packing pressed into a "copper head." A bent wire having two serrated ends is fastened in the paper packing, and forms a cover for the percussion cap. A pin striker is forced through the packing in such a way as to force inwards the metal of the copper head, and also the paper packing, which hold the pin tightly and prevent the back escape of the gases of the exploded powder. The bent wire acts as "a staple to form a bearing for the cap."

[Printed, 10d. Drawings.]

A.D. 1866, October 10.—N° 2622.

SYME, JAMES.—“Improvements in breech-loading fire-arms.”

The improvements are based upon those described in the Specification of prior Letters Patent, granted to the patentee in 1864, numbered 1805. The stock of the gun is made of tubular metal, formed into the required shape, and “filled with hard wood,” or it may be made of wood in the usual way. The stock and barrel are connected together by means of a breech frame made of iron or steel or hard gun metal, cast or forged in the required shape. The breech is closed by a breech block, hinged to the side of the frame, in the rear of which is formed “a curvilinear near loading channel,” for introducing the cartridge and allowing the empty cartridge case to be pushed out by a cartridge extractor. The extractor consists of a projecting piece which is attached to a sliding rod, which is moved by hand. An opening is made round the circular face of the breech block “by cutting “the outer portion of it,” in order to provide “for the safe escape of gas,” in the case of a cartridge exploding accidentally. An inclined striker bolt is made to work in the breech block, and works without a spring. A “screwed socket snap cap” is used for snapping practice.

[Printed, 1s. 2d. Drawings.]

A.D. 1866, October 12.—N° 2642.

WYLEY, ANDREW.—(*Provisional protection only.*)—“Improvements in breech-loading fire-arms and bayonets for the same.”

The breech is proposed to be closed by “a block piece,” which is “attached to and travels with a flat bar, carrying on its fore end a short plunger head, which is interposed between the recoil block and the cartridge.” The extractor “is of the common form,” and is fitted to the lower side of the plunger. In some cases it may be dispensed with by using a plunger “hollowed out” in front, so that it “will firmly grip the cartridge end when the latter is forced into it by the explosion,” and draw it out of the breech end of the barrel. A “shaded foresight” is to be used with military rifles, and the bayonet is “fastened to the barrel by means of an external screw on the latter taking into an internal screw on the bayonet tube or shank.”

[Printed, 4d. No Drawings.]

A.D. 1866, October 13.—N° 2652.

ALBINI, AUGUSTO, and BRAENDLIN, FRANCIS AUGUSTUS.

—"Improvements in breech-loading fire-arms."

The breech is closed by a breech block, which is "hinged to the top or side of the barrel." A striker pin works in the block, and its return motion is obtained either by the action of a spring or by shutting down the block in its place. "In the rear of the hinged block is a cylindrical hole, into which the head of the striker projects," in a line with this hole, or at an angle to it, a sliding bolt works in a recess in the breech chamber. When the hammer falls it impels the sliding bolt forward into the hole in the breech block, which it fastens at the same time that it drives forward the striker pin and ignites the cartridge. An extractor, consisting of projections attached to hinged plates, and moved by the action of the "hinged end of the breech block," pushes out the spent cartridge case. The breech block may be "jointed to a separate ring, shrunk on or brazed on the breech end of the barrel;" the ring is divided at the bottom, and is "slipped into its place from the muzzle end of the barrel."

[Printed, 10d. Drawing.]

A.D. 1866, October 13.—N° 2653.

BOXER, EDWARD MOUNIER.—"Improvements in cartridges for breech-loading fire-arms."

The "anvil" which is placed inside the percussion cap of the cartridge is made "with shoulders or projections so formed as to abut against the edge of the percussion cap," to prevent it from effecting ignition "unless the cap is acted on by the striker of the gun." The base of the cartridge is made "of a separate metal disc and base cup, connected together, and to the case of the cartridge by means of the cap, chamber, and wad." "One or more pieces of coiled metal or cups" are interposed "between the base cup and the cartridge case," and extend beyond the edge of the base cup.

Compressed powder charges, having a hollow or recess in the central part, are used for blank cartridges and for sporting purposes.

The coiled metal case of the cartridge is covered with calico or linen whose "entire surface is cemented to the case by means of shellac or other similar waterproof cement."

[Printed, 6d. Drawing.]

A.D. 1866, October 18.—N° 2692. (* *)

CHAPMAN, CHARLES.—(*Provisional protection only.*)—"Improvements in the construction of ships for war purposes, applicable in part also to the construction of forts." The invention consists in constructing war vessels with a solid mass or masses of metal at each side amidships, at stem or stern, or at both, each such mass to be of such a size that it can be made or pierced so as to form therein one or more chambers, each such chamber being capable of being used as a gun or of receiving a gun. Where the chamber itself is used as a gun, it has an arrangement for the purpose of rendering it breech-loading. When the chambers are employed merely as receptacles for guns, either breech-loaders or muzzle-loaders may be used. When these last are employed the trunnions are dispensed with, and they are fitted beneath or at the sides with friction rollers to enable them to be run in and out with facility; or with a rack and pinion or any similar suitable means. When these masses of metal are employed at the sides amidship the motive machinery is to be placed within the space between the two sides so as to be thereby completely protected from injury by the enemy's shot or shell. It is proposed in some cases to build up dovetailed pieces of metal, keying and bolting them together so as form solid or nearly solid masses of metal, which will answer the same purpose as the solid mass or masses.

The invention further consists, in so constructing the hulls of the vessels as to give the necessary strength and buoyancy to enable them to carry the large masses of metal. In order to do this the inventor constructs within the hull of the vessel a number of tubes, which tubes may run side by side parallel to each other, and be firmly connected to each other and to the sides and bottom of the hull by angle irons and framing, or may be so built up as to intersect each other. By this framing and angle irons the hull of the vessel is connected with the tubes so as to form altogether a strong beam with hollow cells or buoyant compartments.

[Printed, 4d. No Drawings.]

A.D. 1866, October 18.—N° 2695.

MENNONS, MARC ANTOINE FRANÇOIS.—(*A communication from Charles François Galand.*)—"Improvements in breech-load-

"ing fire-arms and in cartridges for the same. Part of which improvements are applicable to ordnance."

The breech end of the barrel is above the top of the stock, and is closed by a cap or plug that screws into the end of the barrel. A sliding pin or striker is made to work in the cap or it is provided with a nipple for receiving a percussion cap.

A cartridge is made by enclosing a charge of "compressed powder" in a cartridge case and placing in its centre a needle or striker which is driven forward and ignites a percussion patch fixed in front of the powder charge.

[Printed, 1s. Drawings.]

A.D. 1866, October 19.—N° 2711.

RESTELL, THOMAS.—"Improvements in breech-loading fire-arms and in cartridges to be used therewith."

The improvements are in part based upon those described in the Specification of former Letters Patent dated March 9, 1866, N° 722. The breech is closed by a horizontal sliding plug which is fastened in its place "by a vertical bolt which is thrown up in the rear of the fore end of the plug" by a lever worked by the lock action.

The base of the cartridge case may be made with a recess which when the cartridge is fired is attached to the front of the plug and is withdrawn with it from the barrel.

In some cases the breech is closed "by a disc hinged to the barrel which is cut through transversely to allow for the insertion of the disc." A needle striker is made to work in the disc and the cocking of the hammer is effected by pushing forward a trigger and it is discharged by pulling another trigger. Or the breech is closed "by a vertical bolt of a width somewhat greater than the bore." Connected with the hinged disc is a cartridge extractor carried by a bar "which works in a groove formed for it in the thickened part of the barrel."

[Printed, 1s. 6d. Drawings.]

A.D. 1866, October 23.—N° 2729.

WILLIAMS, ROBERT THOMAS.—"A new or improved marker's butt or mantlet, together with an improved danger flag, and signals for rifle shooting."

"A folding butt or mantlet" is used by means of which the marker may be entirely covered in, or the door of the said mantlet may be thrown open to form a screen." A danger flag, consisting of a piece of cloth of suitable colour, is so mounted on a roller that it may, when required, be drawn down by a cord and be made to cover a part of the target. Signals of various kinds are made by means of coloured discs attached to a pole which are shewn at will by the marker by means of an endless chain placed under his control.

[Printed, 10d. Drawing.]

A.D. 1866, October 23.—N° 2739.

LAKE, WILLIAM ROBERT.—(*A communication from Timothy James Powers.*)—"Improvements in cartridges and in machinery for manufacturing the same."

Metallic cartridge cases are made by the successive operations of a series of self-acting machines. Blanks are cut from sheet metal by a punching machine which gives the blank a cup shape. The cups are then passed through dies in a second machine and finished upon the mandrils in a finishing machine. The cartridge case is, fourthly, primed with fulminate in a self-acting priming machine, "whereby the fulminate is projected and packed into the basis by centrifugal force," while the cartridge cases are made to rotate on their axes.

The cartridge cases when primed are charged with powder and projectiles in a self-acting charging machine, which feeds in the cases, fills them with the charge, and presses and finishes them. A fulminate compound is made by mixing fulminate of mercury, 16 oz.; gunpowder, 16 oz.; powdered glass, 8 oz.; chlorate of potassa, 12 oz.; and starch, 1 oz. The starch is first mixed with water and the other ingredients are added in succession.

A hard bone-like substance, which is used for the exploding anvils employed in self-igniting cartridges, is made by mixing gunpowder, 16 oz., and starch, 3 oz., in about half a pint of boiling water.

"The fulminate compound may be applied to the cartridge or percussion cap in the usual manner, and when dry the starch gives it a hard, bone-like, and very cohesive character, and while it makes the compound adhere principally to the metal it prevents it from acting on or amalgamating with it."

[Printed, 4s. Drawings.]

A.D. 1866, November 3.—N° 2855.

LEWIS, JOSEPH. — (*Provisional protection only.*) — “Improvements in fire-arms and cartridges.”

A sliding breech plug is proposed to be used for closing the breech end of the barrel, it is locked when in position by “a cross bolt shot” through a slot in the plug. To the front end of the plug is attached “a cradle” for “facilitating the insertion of the cartridge.” “A pointed metallic wire or piercer” is placed in the cartridge so that when its rear end is struck by a striking bolt the front end ignites a percussion patch or cap fixed behind the projectile. Gun barrels are proposed to be rifled at the muzzle end, leaving the breech part of the bore smooth.

[Printed, 8d. Drawing.]

A.D. 1866, November 6.—N° 2875.

MATTHEWS, WILLIAM JAMES. — “Improvements in breech-loading fire-arms.”

A breech block “which moves sideways on a hinge is bored through its entire length,” and is fitted in a case in the rear of the barrel, so as to form a charge chamber. Three holes are made in the block “one for the hinge, one in the centre for the cartridge chamber, and one for the extractor,” the latter is worked by “a lever or handle coming in contact with a projecting piece or block for the purpose of starting empty cartridge cases.” A gas check is made by inserting “a ring or collar in the cartridge chamber,” which is “pressed against the aperture of the barrel.” A needle or striker is fitted in “a tail piece” behind the hinged charge chamber, “and the piece which carries the striker is carried up by the side of the tail piece, so that when it receives the blow from the hammer it forces forward the needle or striker, which when relieved from the pressure of the hammer is brought back by a small coil spring fitted inside the carrier.”

[Printed, 8d. Drawing.]

A.D. 1866, November 6.—N° 2878.

HUNT, THOMAS. — “Improvements in breech-loading fire-arms.”

The improvements are based in part upon those described in the Specification of prior Letters Patent dated May 11, 1866, No. 1361. The breech is closed by a breech block hinged to the

side of a breech frame. In order to aid the action of an ordinary cartridge extractor, which only partially withdraws the spent cartridge case, "an instrument which takes the cartridge case as soon as the extractor leaves it, and by a sudden backward movement "throws it out of the barrel," is employed.

If the "passage by which the cartridge is introduced into the "barrel is closed at the back," an incline is formed "at this "point," and rack teeth formed on the extractor "gear with a "pinion," which moves the instrument by which the flange at the back of the cartridge is seized, and the cartridge case is thrown out "as the extractor flies back by the action of its spiral "spring."

In "central fire-arms in which an inclined needle is employed" the needle is fastened "by means of a bayonet groove."

[Printed, 10d. Drawing.]

A.D. 1866, November 6.—N° 2882.

INCE, THOMAS HENRY.—(*Provisional protection only.*)—"Improvements in fire-arms."

A rest for supporting the rifle is proposed to be made by connecting two tubes, one made to slide within the other. The relative position of the tubes is fixed by means of suitable screws. Cleaning instruments may be placed inside the tubes.

[Printed, 4d. No Drawings.]

A.D. 1866, November 10.—N° 2946.

CLARK, WILLIAM.—(*A communication from Martial Pidault, Guillaume Elièze, otherwise Lagrèze, and Jules Félix Gévelot.*)—

"Improvements in breech-loading fire-arms and cartridges."

The breech chamber of the gun is made "to move backwards "in a line with the barrel to afford room for the introduction "of the cartridge, which backward motion cocks the hammer, "and at the same time holds it in such a position that" it cannot fall accidentally.

The breech chamber is made to move in a frame or case by means of "a lever disposed at the side of the stock, and inside "the chamber is fitted a socket constituting an abutting surface "for the cartridge, which socket is a fixture, and serves to extract "the cartridge case after firing." The socket is bored at its centre to admit the point of a pin striker. "A central-fire car-

"tridge is used," the priming is placed at the centre of a wad of "compressed pasteboard, and then covered with a metal cap enclosing the whole end of the cartridge."

[Printed, 2s. 10d. Drawings.]

A.D. 1866, November 13.—N° 2970.

TONGUE, JOHN GARRETT.—(*A communication from James Ansler-Laffon.*)—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A hinged breech block is proposed to be used for closing the breech end of the barrel. The block "turns over on to the barrel upon a pin or axis on the front end of the breech piece." The breech piece is moved by a lever which fastens the block by interlocking it with projections formed on the breech piece."

[Printed, 4d. No Drawings.]

A.D. 1866, November 15.—N° 2996.

HODGES, EDWIN CHARLES.—"Improvements in the construction of breech-loading fire-arms."

The barrels are tilted or turned down to receive the cartridges in the rear end of the barrels. A cartridge extractor is attached to a rod which "passes through the lump that projects from the under side of the barrels." The forward end of the rod "is acted upon by a small rock lever or tumbler," which is moved by a plate attached to the barrels.

[Printed, 8d. Drawing.]

A.D. 1866, November 17.—N° 3019.

MARIN, NICOLAS MICHEL.—(*Provisional protection only.*)—"Improvements in knapsacks, valises, and other portable cases."

Knapsacks and other portable cases are proposed to be constructed with "a reserve chamber," which is protected from moisture by "a cap flap or door." It may be made moveable so that it can be removed with its contents.

[Printed, 4d. No Drawings.]

A.D. 1866, November 17.—N° 3022.

WEBLEY, THOMAS WILLIAM.—"Improvements in breech-loading fire-arms."

Barrels which are tilted or turned down to receive the charge are fastened by "a double grip-action catch which is composed of "a locking bolt on the axis of a lever which is formed to fit "against the trigger guard." A spring is applied "to this action "to cause the lever after it has been moved to the centre of its "travel to fly over in either direction to completely open or "completely close the catch."

[Printed, 10d. Drawing.]

A.D. 1866, November 19.—N° 3035.

GRUSON, JACQUES HERMANN AUGUSTE.—"Improvements in "gun carriages, and in the means of working heavy ordnance."

The trunnions of the gun carriage are mounted in "bearings "which are supported at the end of triangular or bell crank "levers," which are moved by hydraulic power. The levers "have their fulcrums in a pair of horizontal levers which have "their bearings in the fixed framing."

The carriage is so arranged that the "centre of motion of the "gun" is a point "about or slightly in advance of the muzzle," a slight motion at the muzzle is sufficient to work the gun through a small opening.

[Printed, 1s. 4d. Drawings.]

A.D. 1866, November 20.—N° 3049.

GRUSON, JACQUES HERMANN AUGUSTE.—"Improvements in "the construction of breech-loading ordnance."

The charge chamber is placed "considerably in advance of the "transverse opening in which work the parts for closing and "securing the breech." The explosion is thereby made to take place in a part of the gun which is not weakened by an opening being cut in it. The breech is closed by a conical plug, "which is "provided in front with an elastic packing." It is fastened in its place by "a compound wedge-formed key," which is drawn out when the piece is charged. Lead coated projectiles are employed.

[Printed, 8d. Drawing.]

A.D. 1866, November 20.—N° 3051.

GRUSON, JACQUES HERMANN AUGUSTE.—"Improvements in "the manufacture of guns or heavy ordnance of cast metal."

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Guns are made of cast metal formed of "a mixture of white and best grey charcoal iron," which must be "refined and freed from all impurities." The metal is cast in an iron mould, so that it is "chilled on the surface." The mould is surrounded by a casing, and the molten metal when the mould is filled is "allowed to run over" and fill the space between the casing and the mould, which is thereby heated. The cast metal then cools gradually in the mould so heated, and in "very fine crystals which will indicate greater strength than usual."

[Printed, 6d. Drawing.]

A.D. 1866, December 4.—N° 3183.

WILSON, THOMAS.—(*Letters Patent void for want of Final Specification.*)—"Improvements in the manufacture and construction of cartridges for breech-loading fire-arms."

"The metal cap and tube or cup for receiving the percussion cap and anvil" which for ordinary cartridges are usually made from sheet metal, are proposed to be made of cast metal, cast in sand or in metal moulds. The cap and tube so cast may be afterwards finished by turning them in a lathe. The inner side of the rim or shoulder of the metal cap is made "at right angles to the axis," instead of being curved, so that a good hold is afforded to the cartridge extractor. The metal cap is made of a taper shape. Annular grooves are formed in the cap, into which the base of the metal powder tube is forced so as to effect a firm junction. The front part of the powder tube is attached to the case of the projectile by forcing annular grooves into "corresponding depressions in the projectile."

[Printed, 4d. No Drawings.]

A.D. 1866, December 5.—N° 3198.

FONTENOY, CHARLES MARIN, and DOPFELD, JEAN NICOLAS.—(*Provisional protection only.*)—"Improvements in the fastenings of covers for powder flask or cases used in naval gunnery."

Powder cases are proposed to be made of metal with hermetically closed lids. A ring is fastened by solder upon the case, upon which is fitted a cast lid, which is fastened by projecting lugs. "A greased felt wad" is interposed between the lid and the ring on which it rests, so as to make a water-tight joint.

[Printed, 4d. No Drawings.]

A.D. 1866, December 5.—N° 3204.

PALMER, FITZMAURICE.—"Improvements in projectiles."

The improvements are based upon those described in the Specification of former Letters Patent, dated November 15, 1862, No. 3084. The projectile is formed with a front part "of case hardened iron or steel," attached to a body composed of "compound rings of cast iron or steel," and a "solid plate at the rear," from the centre of which projects a "wrought-iron screw bolt," which serves to connect the front and rear parts together.

In order to insure that the rings forming the body of the shell will break up properly, they are applied in inner and outer series. "The outer rings are cast with spur teeth projections on their inner periphery, and the inner rings are cast with radial wedge-shaped teeth on their outer periphery." The inner rings being forced by the explosion against the outer rings cause the shell to break up into fragments of the required size.

[Printed, 8d. Drawing.]

A.D. 1866, December 8.—N° 3243.

RICHARDS, WESTLEY.—"Improvements in fire-arms and cartridges."

Cartridges made with "a wad of felt saturated with grease at the base" are sometimes inconvenient "in cold climates, as the wad hardens, and there is then some trouble in pushing it forward out of the chamber into the barrel." This is obviated by forming "the mouth of the chamber slightly smaller in diameter than the bore of the chamber," so that when the wad enters it may be easily pushed forward. The barrel may be screwed into a socket having "a slight contraction at the mouth." Central-fire cartridges are made with the base formed of ring wads saturated with grease. In the central hole is fitted "a hat cap" containing the anvil and percussion cap. The flange of the hat cap is placed between and held by two ring wads. The cartridge case is covered with paper, which is "choked" at the base of the bullet.

[Printed, 8d. Drawing.]

A.D. 1866, December 8.—N° 3244.

DINES, HENRY.—"Improvements in breech-loading fire-arms."

At the breech end of the barrel is a tubular breech case, in which

is a breech plug "sliding to and fro within the body." The breech plug "is locked by pressing down a lever pin jointed to its "near end." The lever "lies along the top of the small of the "stock," and is turned upwards by "a thumb piece," to allow the plug to be drawn back from the breech. A spring striker works in the breech plug, to the forward end of which is attached a cartridge extractor, "composed of a spring formed at its forward end with a lug or hook." Or "two such springs may be used, one on either side of the forward end of the plug."

[Printed, 10d. Drawing.]

A.D. 1866, December 10.—N° 3252.

WARMINGTON, EDWARD JAMES.—(*Provisional protection only*).—"Improvements in breech-loading fire-arms and in cartridges to be used therewith."

A breech-loading gun is proposed to be so constructed "that the breech is opened and the hammer cocked by the ordinary act of pulling a trigger, and also that the ordinary act of pulling a trigger shall close the breech, explode the cartridge, and, if desired, release the cartridge case from its fixity of position within the barrel." The breech ends of the barrels are closed by "a breech piece which at its rear end turns on a pin at right angles to the length of the barrel, and the breech end of the barrels is opened by turning down this piece on its pin." Two triggers are proposed to be used, one of which actuates the lock and hammer, and in front of it is another trigger, "which is connected with the axis of the breech piece," and by pulling it the breech piece is turned down.

[Printed, 4d. No Drawings.]

A.D. 1866, December 10.—N° 3253.

NEWTON, WILLIAM EDWARD.—(*A communication from Hiram Berdan*).—"Certain improvements in breech-loading fire-arms, and in cartridges and bullets for the same."

The breech end of the barrel is closed by a breech block which "swings upwards over the top thereof" upon a hinge joint. "One part of the hinge joint is formed upon the breech block, and the other part upon a strap piece which is fitted to move longitudinally upon a spline formed upon or rigidly attached to the top of the barrel." The rear part of the hinged block bears

against a recoil shoulder, the upper part of which is square or nearly so with the line of the bore of the barrel. A spring striker works in the breech block. A cartridge extractor, "consisting of a thin plate of steel of circular form with a radially projecting spur and tooth" is fitted on the pin of the hinge joint of the breech piece, and is moved by it. The breech block is secured by a safety catch. Cartridges are made with an annular wad placed between the powder and the projectile.

An indentation or cavity is made "in the head of the cartridge shell or case" to receive the percussion cap. A wooden plug is inserted in the rear of the projectile to lighten it.

[Printed, 10d. Drawing.]

A.D. 1866, December 15.—N° 3293.

REEVES, FREDERIC WILLIAM, and MUSCHAMP, JOHN BELL.—"An improved explosive substance."

Common rags or other vegetable fibres are "first boiled for several hours in caustic alkali or other alkaline solution," then washed and torn to shreds "by means of a rag machine," and then treated with a solution of chloride of lime, which reduces the fibres to pulp and bleaches them. The fibres are again washed, and if necessary further reduced in a pulping machine. The fibrous mass is then pressed by passing it through rollers and made into sheets which "are steeped in a solution consisting of sulphuric and nitric acids combined in proportions varying according to the purpose for which the explosive material is to be employed." The sheets are then washed and dried.

[Printed, 4d. No Drawings.]

A.D. 1866, December 15.—N° 3301.

ROLLASON, ALEXANDER.—"Improvements in the manufacture of blasting cartridges and fusees."

A case or shell is made of paper like a rocket case, it is closed at the bottom and is placed in a mould, and a fuse is fixed inside the case resting on the bottom. The case is then filled with gun cotton and rammed down. The fuse during the ramming operation is received in a groove formed in the rammer. For ordnance or gun cartridges the gun cotton is reduced in strength by mixing with it in explosive materials. Instead of inserting a fuse a tubular vacant space may be left in the cartridge by inserting a

550 FIRE-ARMS AND OTHER WEAPONS,

rod during the ramming process, which is afterwards withdrawn. When the explosive material is compressed by hydraulic pressure it may be made hard and a hole may be bored in it.

[Printed, 4d. No Drawings.]

A.D. 1866, December 15.—N° 3302.

KIRKWOOD, DAVID.—(*Provisional protection only.*) — “Improvements in breech-loading fire-arms.”

The “double grip” action of the “Lefauchaux fire-arm” is proposed to be facilitated by combining with it “a simple spring or the joint action of a lever and spring, thus combining the grip and snap action if required.” The grip lever is to be made with a hollow in it for receiving the end of another lever which has formed on it a solid fulcrum working in the body.” It is acted upon by “a spring secured to the back of the body.”

[Printed, 6d. Drawing.]

A.D. 1866, December 17.—N° 3310.

NEUMEYER, GUSTAV ADOLPH.—(*Provisional protection only.*) — “Improvements in gunpowder for mining purposes.”

The improvements proposed are based upon those described in the Specification of prior Letters Patent dated June 17, 1865, No. 1636. 72 parts of saltpetre are mixed with about 18 parts by weight of charcoal and 10 parts of flowers of sulphur to form 100 parts of gunpowder. The ingredients are incorporated by mixing them in a closed cylinder in which revolves a shaft carrying radial arms.

[Printed, 4d. No Drawings.]

A.D. 1866, December 17.—N° 3316.

WEBER, MICHAEL.— “Improvements in the construction of fire-arms.”

The barrel is made to turn upon “pivots having their bearings in the side plates of the lock” so as to expose the breech to receive the charge. “To secure a tight closing of the rear end of the barrel it is made segment-shaped, the segment being struck from the centre of the pivot, and it works against a hollow segment-shaped block which is capable of adjustment to com-

"pensate for wear." A second trigger may be used "for cocking and for releasing the barrel."

[Printed, 8d. Drawing.]

A.D. 1866, December 17.—N° 3317.

MAPPIN, WALTER SANDELL.—(*Provisional protection only.*)—

"Improvements in breech-loading fire-arms, and in cartridge case extractors for breech-loading fire-arms, and in cartridges for breech-loading fire-arms."

A hinged charge chamber open at both ends is proposed to be attached to the breech end of the barrel. The charge chamber is raised so as to allow the charge to be inserted in its rear end, and it is then depressed and fastened by a bolt. A hooked cartridge extractor is used. Cartridges are made by placing the powder charge round an axial stem attached to the rear end of the projectile, which serves as an anvil for the percussion cap.

[Printed, 4d. No Drawings.]

A.D. 1866, December 17.—N° 3318.

WOOD, WILLIAM.—(*Provisional protection only.*)—"Improvements in breech-loading fire-arms."

A shoe or breech chamber is proposed to be attached to the rear end of the barrel, and to the rear end of the breech chamber is hinged a breech block in which works a spring striker. The striker is driven forward by a hammer which works below the shoe through a slot formed in it. A cartridge extractor consisting of a hook attached to a sliding bar on the top of the barrel is moved by hand.

[Printed, 4d. No Drawings.]

A.D. 1866, December 18.—N° 3323.

CUSACK, JAMES WILLIAM.—(*Provisional protection only.*)—

"Improved means or method for facilitating artillery and rifle practice at long distances or short ranges."

A target is proposed to be erected at a short range, which will represent the apparent size of a given target at a given long range. Over the target at the short range is fixed a second and similar target; the height at which the second target is fixed is so calculated that it will be struck by the shot when the gun is

elevated for the long range. Practice at the upper target will become equivalent to practice at a long range target.

[Printed, 4d. No Drawings.]

A.D. 1866, December 18.—N° 3325.

MACINTOSH, JOHN.—“Improvements in breech-loading guns “ and projectiles.”

The improvements are in part based upon those described in the respective Specifications of prior Letters Patent, granted in 1852, No. 14,041, and in 1860, No. 1290. The gun is charged at the breech with the projectiles, and in the cavity formed in the rear projectile is inserted a charge of powder, contained in a tube attached to a wad. The tube fits the cavity formed in the projectile, and when its charge is fired, it propels the front projectile from the gun. Another projectile with its charge tube and wad is then inserted in the breech of the gun, which is then ready to be again fired.

[Printed, 4d. No Drawings.]

A.D. 1866, December 19.—N° 3339.

HAYMAN, FRANZ.—(*A communication from Charles Robert Gillon.*)—(*Provisional protection only.*)—“Improvements in “ breech-loading fire-arms.”

The gun is proposed to be made with a trough-shaped charge chamber attached to the breech end of the barrel. A breech block carrying a spring striker is “jointed at its fore end to the top of “ the body.” On the under side of the block is “a strong hook “ or projection which descends through a slot” formed in the charge chamber, which is locked by a transverse bolt, worked by a lever handle.

[Printed, 4d. No Drawings.]

A.D. 1866, December 20.—N° 3356.

MARTIN, RENÉ LOUIS.—(*A communication from Oscar Oelkers and Frederic Spengler.*)—“Improvements in breech-loading fire- “ arms.”

The barrels are tilted or turned down to receive the cartridges, which are fired by needle strikers “fitted at their rear ends in “ blocks loosely connected by screw pins at their rear to tumblers “ hinged to the action.” The barrels are fastened by a locking

lever, which locks the barrels and cocks the needles for the next discharge. Gas-tight joints are made by means of a ring placed "on the rear end of each barrel," and fitting into "corresponding recesses in the breech." A catch or key is used to prevent the needles from "being acted upon when it is desired to have the piece at half cock."

[Printed, 10d. Drawing.]

A.D. 1866, December 20.—N° 3357.

LUNGLEY, CHARLES.—"Improvements in war ships, forts, guns, and armour, and in fitting and working them."

Moveable prows or spears that may be protruded or drawn back are fitted in ships of war. The moveable prow or spear is attached to a piston worked in a tube in the bow of the ship by hydraulic pressure. In working guns in ships or forts, the guns are fitted in trunks made "of a taper form, so as to allow of training for the gun." In the trunks are fitted "elastic tubes of a conical form, or otherwise to allow the guns to be worked through them in any weather, and made to be self-closing when the gun is in board." The elastic tubes form valves; they may be "fitted to ordinary ports." When the gun is placed near the water, a valve is fitted "inside the gun, with a rod reaching to the projectile, so that the valve will clear the gun the instant the explosion takes place." In some cases "a sphere of iron or elastic material" is fitted as a "port stopper." Self-acting machinery is used for working the guns. Guns are made "to load at any distance from the muzzle," and are fitted with flanges to receive bolts, and the opening is stopped "by means of covers or plugs." Armour plates are made with edges of a dovetail form, or "with rabbets to the edges, so as to hold in the wood or other backing." The plates are made "with projections at the back, so as to gain more resisting power with the same weight." The plates and backing are made of a diagonal form. Covers for ports are made self-acting by connecting them with counterbalance weights.

[Printed, 1s. Drawing.]

A.D. 1866, December 22.—N° 3382.

BENSON, JOHN SOLOMONS, and VON DER POPPENBURG, JOHANN.—"Improvements in breech-loading fire-arms."

The breech end of the barrel is closed by a hollow sliding plug working in a prolonged breech chamber. In the rear end of the plug is "a tubular slide, capable of partial rotation therein," and carrying a sliding hammer to which the needle is affixed, and which is actuated by a coiled spring. A sliding cover slides on the top of the breech chamber, "jointed to the front end of the sliding plug is a lever or hinged cover," which serves as a handle to move the lever, and also fix the plug in its place. "Near the jointed end of the hinged cover is a cross piece, the outer ends of which, when the plug has been pushed home and the hinged cover shut down, pass through holes in the fixed cover of the plug," and enter slots in the plug and in the sides of the breech chamber, and so fasten the plug in its place. "The end of the tubular slide outside the shoe [or breech chamber] is provided with a handle, by which it can be moved longitudinally, and also through a portion of a circle," it is fastened by a stud working in an undercut shoulder, "made in the head or handle of the hinged cover." Paper or linen cartridges may be used, and a gas-tight joint is made by inserting a ring in the breech end of the barrel. When cartridges with metallic heads are used, the spent cases are removed by means of an "extractor plate," of a "nearly semicircular figure," carried by a stem working in a slide and moved by the sliding plug. In some cases a chamber or recess is formed in the front of the sliding plug, and when the cartridge is fixed, the metallic head is expanded into the recess of the plug, and being thereby attached to it, is withdrawn when the plug is pulled back to reload the piece.

[Printed, 1s. 6d. Drawings.]

A.D. 1866, December 22.—N° 3383.

COOPER, JOSEPH ROCK.—"Improvements in breech-loading fire-arms."

The breech end of the barrel is closed by a sliding plug which is moved by a handle, and locked by a partial turn. In the axis of the plug is a needle striker, actuated by a coiled spring. The gun is discharged by means of "a quadrant shaped hammer," which works through a slot in the under side of the shoe or breech chamber. The hammer has an arm carrying "a small roller, against which the mainspring of the gun presses." The hammer is cocked by the breech plug, which depresses the quad-

rant as it passes over it when drawn back. The hammer cannot be made to act except when the breech plug has been properly pushed home into the breech end of the barrel, as in that case "a curved cam or incline" on the lowest part of the plug receives the blow of the hammer, and prevents the rear end of the striker from being struck.

[Printed 1s. Drawings.]

A.D. 1866, December 29.—N° 3425.

MANCEAUX, FRANÇOIS JULES.—(*Provisional protection only.*)
—"Improvements in breech-loading fire-arms and in cartridges for the same."

"An arrangement for producing the percussion" is proposed to be used "in the interior of the barrel of the arm." This arrangement is composed of a cock, a conical rod of a particular shape, a screw pivot, and a lump or enlargement of the barrel. A special cartridge is proposed to be employed with the percussion arrangement referred to, consisting of modification of the cartridge described in the Specification of prior Letters Patent, dated January 13, 1859, No. 114.

[Printed, 4d. No Drawings.]

A.D. 1866, December 31.—N° 3442.

HENRY, ALEXANDER.—"Improvements in fire-arms."

The breech end of the barrel "is attached to a strong partly open and partly tubular frame, or, as this may more strictly be called, the breech holder, to a suitable hinge-formed recess in which the breech piece proper is connected by a hinge joint in such a manner that the breech piece may be turned on the joint so as to fit into the tubular or conical recess in the breech holder, and close the end of the barrel, or be turned in an opposite direction, leaving the barrel open for loading." The lower part of the hammer has attached to it a short lever connected with a spring. When the hammer is drawn back, the projecting lever moves a sliding bolt which acts on the hinged breech piece, and "so raises or starts the breech from its bed and retaining catch." The spent cartridge case is withdrawn by an extractor bolt sliding in a recess underneath the barrel, and moved by hand. Or a lever extractor is used: the lever "passes out from the stock behind the trigger guard, and its inner end

“ acts upon the metallic flange of the cartridge case, so that the
“ outer portion of the lever being pushed forward ” when the
breech piece is raised, the cartridge case is withdrawn from the
breech end of the barrel.

[Printed, 2s. Drawings.]

A.D. 1866, December 31.—N^o 3447.

POCOCK, GEORGE PEARCE.—“ Improvements in breech-load-
“ ing fire-arms.”

The breech is closed by a breech block, “ which is made to
“ retreat in a diagonal direction from, and open the breech end
“ of the barrel.” The breech block works in “ a chamber made
“ in the body of the gun immediately behind the rear end of the
“ barrel, and extending downwards and rearwards in a diagonal
“ direction through the body and stock of the gun.” The breech
block is moved by a screw action worked by a lever below the
stock, or by a link motion worked by a similar lever. A sliding
extractor works below the barrel, and is moved by the breech block,
to which it is “ connected by a steel or other elastic link.”
Metallic cartridges carrying their own fulminate are used, “ and
“ they may be made either on the central-fire or flange-fire
“ principle.” A pin striker is employed, and it may “ pass
“ through the breech block in a horizontal direction,” or a curved
form of striker may be used; the lower part of the curved striker
being driven backwards by the lock action, causes the upper part
to strike in a forward direction against the rear of the cartridge.

[Printed, 10d. Drawing.]

APPENDIX.

A.D. 1829, June 1.—N° 5797.

MANN, WILLIAM.—“That by the application of compressed air power and motion can be communicated to fixed machinery, and to carriages and other locomotive machines, and to ships, vessels, and other floating bodies.”

Air is compressed by means of a series of pumps of respective capacities, which gradually decrease in a given ratio, the air after being compressed in the larger pump being transferred to, and further compressed in, the smaller pumps. The air so compressed is stored in chambers which may be made portable, so that the power can be conveyed to any required place; or pipes may be connected with a central chamber, as in the case of guns in a battery, which may be charged with compressed air by means of a small pipe, which would convey it round the ramparts, and supply all the ordnance in the batteries.” Supposing the air to be introduced into the charge chamber of a gun “at a speed of 2,000 feet per second, then a pipe of half an inch area would convey upwards of 400 cubic feet of the compressed air per minute, each cubic foot containing a quantity of power equal to about 72 lbs. weight of gunpowder.” The compressed air is proposed to be used for working stationary and locomotive and marine engines, and for other purposes, as well as for propelling projectiles.

[Printed, 6d. No Drawings.]

A.D. 1838, January 31.—N° 7559.

PEPPERCORNE, GEORGE RYDER.—“An improved machinery to be employed for locomotion on railroads and other roads, which is also applicable to other engines for exerting power.”

A framework is attached to the carriage, which may be used for artillery or other purposes, and is so arranged that the weight of the draught animal is wholly or partly “carried by the interposition of certain springs, bars, girths, and braces.” The weight of the animal being partly carried by the framework, the

A.D. 1849, November 24.—N° 12,861.

COWPER, CHARLES.—(*A communication from Messrs Petia, Gaudet, and Co.*)—"Improvements in piling, fagotting, and forging iron for plates, bars, shafts, axles, tyres, cannon, anchors, and other similar purposes."

This invention relates partly to the manufacture of wrought-iron cannons, mortars, and other ordnance. The piles or faggots from which the cannons are to be forged are composed of bars of a trapezoidal or wedge-shaped section, placed with their inclined faces in contact, so as to form a series of oblique joints; the object being to insure perfect welding, and prevent that tendency to separate under the blows of the hammer which is urged as an objection to the perpendicular joints produced when bars of a rectangular section are used.

Instead of employing bars with plane sides, the piles or faggots may be formed by surrounding a cylindrical bar of iron with bars of a peculiar curvilinear section, whereby all the joints will be curved; or these bars may be made with two of their sides straight, but so that the joints will be in straight lines which do not radiate from the centre. The pile or faggot is brought to a welding heat and hammered between hollow dies or swages which form the faces of the hammer and anvil.

A further improvement consists "in surrounding a central mass or faggot with bars of a trapezoidal section, laid round it in the form of a helix or screw, and again surrounding this first layer with several others, applied by mechanical means, and in then submitting the new faggot, thus obtained, to the action of the hammer between swages or dies of the proper form and dimensions."

A peculiar method of welding the trunnions to wrought-iron cannons and other ordnance also forms part of this invention.

[Printed, 1s. 2d. Drawings. See *Mechanics' Magazine*, vol. 52, p. 437; and *Patent Journal*, vol. 9, p. 106.]

A.D. 1852, May 22.—N° 14,130.

ROBERTS, RICHARD.—"Certain improvements in and application of cable to boats, ships, and other vessels."

The improvements are described under 33 heads, and relate to the construction of the hulls and frames of ships, also to the means of storing water, also to the construction of rudders, and

of propellers, and of masts, and of anchors, and to steam boilers and engines, and to coal bins, and to life boats, and hoisting and lowering apparatus; also to shields, which are "hinged to the bulwarks all round the vessel in such wise as to admit of their being taken off and replaced with facility." Vessels of war are provided with "trimming fins," so arranged as to "increase the immersion on the side next the enemy." Sighting apparatus is fixed on the deck, which, by measuring angles subtended by a distant object, will enable its distance to be estimated. Guns are discharged simultaneously by causing their hammers to be actuated by levers worked by a common shaft. The gun carriage is mounted on wheels which run on inclined rails, and is connected by cords to a drum; the recoil is "absorbed by the break," and the weight of the gun is used to run it out. Ammunition is raised by elevators attached to endless chains worked by suitable drums or pullies. Caoutchouc in sheets is used for the "vents of vessels," and to carry water from the deck or other places; the weight of the column of water overcomes the tension of the caoutchouc and opens the vent.

[Printed, 3s. 2d. Drawings.]

A.D. 1853, July 16.—N° 1703.

COLT, SAMUEL.—(*Partly a communication.*)—"Improved machinery for boring metals."

In boring gun barrels "loss of time has hitherto been occasioned by drawing back the boring tool;" this is obviated by fixing the tool in a socket which slides in a guide standard, and is driven forward by a screw. The boring tool and the traversing screw are so arranged "that they will admit of being slid in the direction of their length for the purpose of withdrawing the tool from its work." For boring the chambers in the revolving breech of a revolver fire-arm the tools are mounted in "a rotating frame for the purpose of bringing them into position and giving them an independent longitudinal motion." Special chucks are employed.

[Printed, 1s. 2d. Drawings.]

A.D. 1854, April 3.—N° 759. (* *)

BOBŒUF, PIERRE ALEXIS FRANCISSE.—(*Provisional protection only.*)—"The application of electricity and fixed or moveable aerostation to military strategy and pyrotechny."

This invention consists:—

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XX

1st. "In the employment of fixed or moveable balloons, retained by ropes enclosing wires for conducting electricity, and which may be put in communication with electric telegraphs, operating so as to obtain the instantaneous transmission of observations or orders necessary for directing the balloon, or loosening & inflaming the hostile matters raised by the balloon."

2nd. "In the employment of the gas used for inflating the balloon to the projection of missiles by the means of a compressing apparatus."

3rd. "In the isolated, simultaneous, and instantaneous inflammation of the explosive matters used in pyrotechny by means of the electric battery."

[Printed, 4d. No Drawings.]

A.D. 1858, March 18.—N^o 554.

ANDERSON, SIR JAMES CALEB.—(*Provisional protection only*).—"Improvements in locomotive or other carriages."

The improvements relate to, among other things, the wheels of locomotive engines, gun carriages, and other carriages. The bearing wheels of the carriages are proposed to be so constructed and arranged "that each wheel will run on the concave surface of a larger wheel, which is to form its railroad."

[Printed, 4d. No Drawings.]

A.D. 1859, March 30.—N^o 798.

COLES, COWPER PHIPPS.—"An apparatus for defending guns and gunners in ships of war, gun-boats, and land batteries."

The invention consists in the employment of a convex or other suitably shaped shield, made of "thick iron or other metal," as "an apparatus for defending guns and gunners in ships of war, gun-boats, and land batteries." The shield is described as being mounted on a "revolving platform or frame, which is capable of revolving after the manner of a turn-table," being made to turn "about a central bolt or stud" or a hollow cylindrical casing, and to run on rollers or balls. The gun is made to protrude through a suitable aperture or porthole, and rotatory motion is given to it by means of gearing that may be worked by hand or by other means. The form of the shield may be varied; on board ship it should be so placed that the common centre of gravity of shield and gun "may be caused to fall in the centre about which the whole rotates."

[Printed, 6d. Drawing.]

A.D. 1861, September 30.—N° 2431.

SMITH, THOMAS.—"Improvements in the construction of "umbrellas adapted to purposes of self-defence, some of which improvements are also applicable to other purposes."

A hollow steel tube is employed "with steel dagger at the end "with a guard cover which screws over it." The various parts, ribs, joints, and stretchers are made of steel.

[Printed, 4d. No Drawings.]

A.D. 1862, April 25.—N° 1220.

HALE, WILLIAM.—"Improvements in rockets."

The gases of combustion are employed "so that the whole "power of the gas shall be exerted in giving the onward motion," while it also effects rapid rotation in the rocket. Three tubes are screwed "into the cast-iron tail piece of the rocket" at equal distances from the central aperture. From each tube one half of the side is cut away, "for the purpose of allowing the gas "as it escapes in its compressed state to expand on one side of "each tube in a direction that makes a tangent to the circle in "which the tubes are placed; while on the opposite side it is "prevented from expanding by the half tubes that remain, thus "producing an unbalanced pressure that causes the rocket to "rotate rapidly about its longitudinal axis." In some cases the tubes may be formed with the tail piece in one casting.

[Printed, 10d. Drawing.]

A.D. 1862, July 12.—N° 2013. (* *)

BARBER, HENRY, and DE GARRS, HENRY.—"Improvements "in rolling iron, steel, and other metals for cutlery, tools, and "other purposes."

This invention consists in rolling iron, steel, and other metals "in such a manner that the material, when rolled, shall vary in "thickness across its width so as to correspond with the varying "thickness of the article for which it is intended."

One essential feature of the invention consists in the use of "excentric rolls for rolling goods singly, alternately, edgewise, "and flatwise, the rolls being suitably grooved for such purpose," the patentees mentioning that certain articles, including

"bayonets," "are already rolled singly with excentric rolls, but "flatwise only," from which it would seem that they contemplate the application of this part of the invention to the formation of such articles. They do not, however, describe any special application of the invention thereto.

The details of the invention are set forth at some length, and illustrated by a drawing containing representations of rolls of various forms. The invention includes "the application and use of "ingots cast as nearly as possible or practicable in the same proportion crosswise as the articles intended to be rolled are lengthwise, and of rolls grooved proportionally to them;" also "the application of taper rolls for all kinds of bevilled rolling;" also the application of excentric rolls for rolling table knife blades, forks, joiners' chisels, and single-ended spring knife scales "in the sheet;" and they also describe the application of the invention to the formation of double-ended spring knife scales, plane irons, turnscrews, scythe blades, tenon saws, file blanks, daggers, skate blades, skate clogs, trowels, bowie knives, and other articles.

[Printed, 8d. Drawing.]

A.D. 1862, July 15.—N^o 2035.

GHISLIN, THOMAS GOULSTON.—"Improvements in the treatment or preparation of British and foreign algæ, and the application of the same to various branches of the arts and manufactures."

"Sea weeds of the order algæ" are steeped in sulphuric acid for about three hours, and are then dried and ground to powder. The powder is then mixed with glutinous or gummy matters, or solutions of india-rubber or gutta-percha, and with coal-tar, the whole being well mixed and boiled together. Sulphur, rosin, and alum are added to the mixture while in a pasty state, and it is then baked in an oven at about 300° F. The mass is brought into a plastic state and may be moulded and pressed and used for various purposes where horn, bone, ebony, and similar substances are usually employed.

The process described above is referred to in a subsequent specification (No. 1072, A.D. 1864), of which an abridgment is given below.

[Printed, 4d. No Drawings.]

A.D. 1864, April 28.—N° 1072. (* *)

GHISLIN, THOMAS GOULSTON.—“Improvements in the treatment and application of seaweed.” The patentee employs any of the common kinds of seaweed, and, having treated them in the manner described in the Specification of his Patent dated July 15th, 1862, No. 2035, dries them and reduces them to an impalpable powder, or, if operated upon when wet, makes them into a paste. The powder or paste is incorporated with the following ingredients or some of them, and in proportions according to the articles to be manufactured: gums, gum resins, including india-rubber, gutta percha, and substances of that class, resins natural or artificial, bituminous substances and the products of the same, paraffin and oily or fatty substances, fibrous materials, the silicates of potash and soda, pulverized chalk, talc, and other earthy matters, metallic oxides, gelatine, farina, alum, tungstic acid, powdered charcoal, and other analogous substances. He states the particular ingredients and the proportions which he prefers, according as he requires tenacity, elasticity, solidity, or durability. He mixes and incorporates the mass in a masticator provided with rollers or other mechanism, and then passes it between cylinders. He enumerates the various purposes for which this “algaeite” is available; amongst them are sword handles. The compound may be hardened and rendered impermeable to water “by steeping it in boiled oil, or in any drying oil, or in a solution of gum or resin, or in any kind of varnish.”

[Printed, 4d. No Drawings.]

A.D. 1864, May 26.—N° 1310.

BROWN, JOHN HARCOURT.—“Improvements in treating animal substances for the manufacture of size, pulp and pulpy matter, and converting the said pulp or pulpy matter into sheets, slabs, blocks, thread, hollow or tubular articles, and such other articles of commerce, for which the said sheets, slabs, blocks, thread, hollow or tubular articles may be applied.” The fibres of skins of animals and of other animal tissues are formed into sheets forming a kind of artificial parchment or vellum or leather. In some cases the fibres are formed into “thick sheets or blocks for backing armour plates and other

BATTERY (CARRIAGE), TIERS OF BARRELS :

Sax, 154.
 Scott, 183.
 Clarke (*Castay and De Revidre*), 168.
 Bourne, 171.
 Sievier, 181.
 Billinghamurst and Regna, 264.
 Lillie, 298.
 Matthew, 324.
 Peniston, 328.
 (Submarine) Hughes (*Doty and Downer*), 336.
 Johnson, 431.
 Walker, 482.
 Lungley, 553.

BAYONETS :

Dennet, 36.
 Hollis, 114.
 Smith, 125.
 Brooman (*Manceaux*), 130.
 Brooks, 188.
 Vaughan, 189.
 Henry (*Descontures*), 196.
 Newton (*Starr*), 235.
 (Dagger) Clark (*Dumonthier*), 298.
 Bousfield (*Waters*), 325.
 (Dagger) Bonneville (*Lambin and Theale*), 332.
 Clarke (*Berdan*), 400.
 Brooman (*Rochas*), 435.

BELT. See Shot Belts; also**Knapsacks.**

Prater, 92.
 Bourke, 240.

BLASTING. See Gunpowder.

(Tube for) Opie, 60.
 (Cartridge) Webb, 98.
 (Powder) Kellow and Short, 237.
 (Cartridge) Cunnack, 298.
 (Powder) Buddenburg, 311.
 Rollason, 549.

BOWS :

Norton, 401.

BREAST PLATES :

(Wire) Ramspacher and Schmidt, 76.
 Keiffer, 76.

BREECH.

(Tube pillar) Dougall, 36.
 (Moveable plug) Prince, 53.
 (Moveable plug) Adams, 77.
 (Moveable) Reeves, 139.
 (Depressed) Newton (*Starr*), 235.
 (Moveable) Grimston, 404.

BREECH-BLOCK. See also Breech-loading.

(Depressed) Parsons, 361.
 (Depressed) Muir, 426.
 (Depressed) Bousfield (*Peabody*), 428.
 Soper, 448.
 Newton (*Lugo*), 452.
 Needham and Needham, 457.

BREECH-JACKET :

Lancaster, Brown and Hughes, 107.

BREECHINGS. See Gun Carriages.**BREECH-LOADING ACTION. See Locks.****BREECH-LOADING CANNON :**

Quin, 3.
 Restell, 7.
 Lindner, 13.
 Leech, 19.
 Treeby, 21.
 Warry, 24.
 Maudalay, 28.
 Rawbone, 34.
 Wilson, 35.
 Martin, 37.
 Ambler, 38.
 Brooman (*Rochas*), 39.
 Warry, 41.
 Gosling, 41.
 Abbot, 58.
 Whitworth, 57.
 McKenzie and Wentworth, 57.
 Le Jeune, 61.
 Warry, 63.
 Whitby and Demprey, 66.
 Brooman (*Cochran*), 67.
 Parsons, 70.
 Lancaster, 71.
 Haddan, 91.
 Clarke (*Forbes and Challen*), 98.
 Newton (*Brown*), 100.
 Preston, 101.
 Prince, 105.
 Macintosh, 106.
 Wilson, 109.
 Rose, 115.
 Grant, 116.
 Walsh, 121.
 Wilson, 124.
 Vandenburgh, 133.
 Picken, 138.
 Bessemer, 139.
 Storm, 141.
 Lawden and Jones, 142.
 Dowry, 147.
 (Wedge breech) Armstrong, 150.

**BREECH-LOADING CANNON—
cont.**

Parsons, 150.
Wood, 152.
Warry, 157.
(Reflecting) Naglost, 163.
Healey, 164.
Manceaux, 165.
Clark (*Castay and De Riviere*), 168.
Limbirt, 169.
Brooman (*Broadwell*), 170.
Cowan, 185.
Davies (*Joslyn*), 188.
Gibson, 191.
Vetterlin, 192.
Newton (*Bryse and De Forest*), 193.
Henry (*Louis and Descouvertes*), 196.
Jefferies, 196.
Marsh, 199.
Moore, 247.
Cowan, 249.
Curtis, 250.
Richards, 250.
Krupp, 255.
Blakely, 263.
Richards, 264.
Brooman (*Broadwell*), 284.
Broadhead and Murdock, 290.
Snider, 302.
Smith (*Gregory*), 304.
(Light) Dougall, 309.
Melland (*Snider*), 315.
Parsons, 316.
Baker, 317.
Linder, 327.
Pigot, 340.
Burton, 345.
Clarke, 345.
Hutchins, 346.
Parsons, 356.
Frazier, 357.
Wilson, 359.
Matthews, 380.
Parsons, 361.
Haydon, 361.
Needham, 365.
Mathew, 371.
Wilson (*Dursien and Brown*), 376.
Wilson, 376.
Wilson, 377.
Clark, 378.
Davis, 387.
Clarke, 408.
Joyce, 412.
Krupp, 414.
Broadwell, 430.
Colley, 440.
Newton (*Jardinier*), 441.
Tranter, 443.
Law and Law, 447.
Soper, 448.
Murphy, 467.
Koutzen, 522.

**BREECH-LOADING CANNON—
cont.**

Stuart, 533.
Birney, 538.
Gruson, 545.

BREECH-LOADING SMALL

ARMS :

Morse, 2.
Newton, 2.
Quin, 3.
Restell, 7.
Aston, 8.
Pilon, 13.
Lindner, 13.
Richards, 17.
Leetch, 19.
Epingille, 19.
Treeby, 21.
Bussey (*Knauth*), 22.
Ramscar and Scott, 25.
Smith, Townsend, and Williams, 26.
Manceaux and Vieillard, 29.
Sharps, 30.
Hammond, 30.
Prince, 31.
Wilson, 32.
Cooper, 33.
Ayerst (*Sears*), 33.
Newton (*Smith*), 34.
Rawbone, 34.
Newton (*Merrill*), 35.
Nelson, 36.
Martin, 37.
Burton, 37.
Maynard, 38.
Brooman (*Rochaz*), 39.
Wilson, 45.
Oldbury, 46.
Gwyn (*Gross*), 49.
Russell, 50.
Burton, 50.
Hart, 51.
Erskine, 53.
Whitworth, 57.
McKenzie and Wentworth, 57.
Field, 58.
Jones, 59.
Grainger, 59.
Le Jeune, 61.
Bentley and Sillem, 63.
Smith, 63.
Hanson, 65.
(Converted) Daniel, 67.
McKenzie and Wentworth, 68.
Lancaster, 71.
Harding, 72.
Reeves, 73.
Bayliss, 75.
Wilson, 76.
Adams, 79.
Roberts, 79.
Cooper, 79.
Dawes, 79.
(Converted) Shelden, 80.

BREECH-LOADING SMALL
ARMS—*cont.*

Scott, 65.
Green and Green, 86.
Schwab, 87.
Palliser, 88.
Grainger, 92.
Deane, Deane and Harding
(*Deloigne*), 93.
Rigby and Norman, 95.
Vandenburgh, 96.
Oriard, 99.
Harvey, 100.
Preston, 101.
Walsh, 102.
Dougall, 102.
Roberts, 103.
Gedge (*Humbertjean and
Matthey*), 103.
Bippleston, 104.
Prince, 105.
Macintosh, 106.
Harding, 107.
Wilson, 109.
Gloag, 112.
Rose, 115.
Wilson, 115.
Bentley and Bentley, 117.
Walsh, 121.
Golden, 122.
Fitzgerald, 124.
Wilson, 124.
Green, 128.
Spence (*Magnard*), 129.
Storm, 131.
Cooper, 133.
Reeves, 134.
Rigby and Needham, 134.
Newton (*Gallagher*), 136.
Jeffery, 140.
Mennons, 142.
Lawden and Jones, 142.
Marson, 148.
Scott, 149.
Parsons, 150.
Newton (*Spencer*), 151.
Wood, 152.
Bailey, 153.
Jones, 155.
Leetch, 156.
Manceaux, 165.
Coles, 166.
Henry (*Jame*), 166.
Schneider, 167.
Grant, 168.
Sturrock, 172.
Holland and Payton, 172.
Mennons (*Rousseau*), 173.
Murcott and Hanson, 174.
Richards, 174.
Wyley, 180.
Walker, 183.
Mathew, 187.
Brooman (*White*), 190.
Henry (*Descoutures*), 196.
Jefferies, 196.
Marsh, 199.
Baggett and Sanger, 204.

BREECH-LOADING SMAI
ARMS—*cont.*

Horsley, 207.
Waller (*Tylor, Woo
Carey and Wilkinson*), 21
Brownlow, 213.
Parfrey, 216.
Walker, 217.
Browne (*Patte*), 223.
Milward, 223.
Mennons, 230.
Needham, 231.
Day, 232.
Loft, 233.
Lawden, 233.
(Falling breech) Newt
(*Starr*), 235.
Schneider and Snider, 238
Turner and Taylor, 239.
Rigby, 240.
Green and Green, 241.
Cassegrain, 244.
Horton (*Ender*), 244.
Moore, 247.
Jones, 248.
Cowan, 248.
Johnson (*Descoutures*), 2
Richards, 250.
Brooman (*Gastenne*), 253.
Jefferies, 261.
Albini, 262.
Field, 262.
Field, 263.
Murrell, 267.
Hughes (*Schmalz*), 268.
Walsh, 270.
Bousfield (*Hartshorn*), 27
Clark (*Geurriero*), 274.
Clark (*Canalon*), 274.
Pryse and Kirkwood, 275.
Newton (*Therasson*), 278.
Purdey, 280.
Snider, 281.
Johnson (*Pollak*), 283.
Hughes (*Mayer*), 283.
Brooman (*Broadwell*), 284
Stafford, 287.
Marrison, 287.
Brooman (*Saez*), 288.
Brooks, 288.
Gibson and Trulock, 290.
Bonnevillie (*Marcel*), 291.
Elliott, 292.
Horton, 294.
Tranter, 294.
Walsh, 297.
Pope, 299.
Newton (*Alger*), 300.
Lewis, Walker, and Wayn
300.
Agnew, 301.
Braendlin, 301.
Greener, 303.
Le Patourel, 305.
Harlow and Harlow, 306.
Horsley, 308.
Matthews, 308.
Crowell (*Strong*), 309.

BREECH-LOADING SMALL ARMS—cont.

Fletcher, 310.
Hinton, 312.
Melland (*Snider*), 315.
Richards and Willets, 320.
Wilson, 322.
Smith, 323.
Marrison, 323.
Byrnes and Benjamin, 328.
Wilkins, 330.
Brazier, 336.
Harrison, 337.
Newton, 338.
Sheppard, 342.
Davies (*Joslyn*), 343.
Matthews, 346.
Hill, 349.
Snider, 350.
Powell, 356.
Haseltine (*Day*), 358.
Parsons, 361.
Ambruster, 362.
Pope, 362.
Aldred and Bainbridge, 363.
Saville, 364.
Wyley and Grainger, 364.
Needham, 365.
Davies (*Morgenstern and Jenks*), 365.
Wyley, 366.
Cooper, 368.
Wilson, 368.
Redman and Kirkwood, 370.
Wilson, 370.
Collins and Pountney, 370.
Wilson, 373.
Petito, 375.
Wilson, 375.
Clark, 378.
Brooman (*Sax*), 379.
Walsh, 379.
Harriss, 370.
Hurry and Wilson, 381.
Turner, 382.
Muir, 382.
Bolton (*Dauzat*), 384.
Turner, 385.
Westwood and Broadhurst, 387.
Snider, 390.
Newton and Shepard, 391.
Rydbeck, 392.
Restell, 395.
Tongue (*Redondo*), 396.
Leetch, 396.
Snider, 397.
Reeves, 397.
Matthews, 398.
Wilson, 399.
Clark (*Berdan*), 400.
Swinarski, 403.
Meyer and Meyer (*Gerhardt*), 406.
Daw, 406.
Ansell, 407.
Bousfield (*Fitzgerald*), 407.

BREECH-LOADING SMALL ARMS—cont.

Edge, 408.
Newton (*Remington*), 408.
Snider, 409.
Trulock, Trulock and Trulock, 409.
Clark (*Minet*), 410.
Russell and Needham, 410.
Joyce, 412.
Lindner, 414.
Poppenburgh, 416.
Purdey, 416.
Thompson (*Snider*), 417.
Aubin, 417.
Tolhausen, 420.
Braendlin (*Storm*), 421.
Brooman (*Maynard*), 421.
Cook and Cook, 422.
Lancaster, 425.
Muir, 426.
Mayall, 427.
Henry, 428.
Bousfield (*Peabody*), 428.
Fontainemoreau (*De Puy-chauveix*), 429.
Carle, 430.
Carr, 430.
Law, 432.
Conybeare, 432.
Hugon, 432.
Cooper, 433.
Craig, 433.
Brooman (*Rochaz*), 435.
Ebrall, 435.
Paton, 436.
Wilson, 436.
Tranter, 443.
La Penotiere, 443.
Webley, 446.
Snider, 449.
Prince, 451.
Newton (*Berdan*), 452.
Prince, 453.
Lindner, 454.
Millar and Burton, 455.
Williams (*Rohde*), 457.
Needham and Needham, 457.
Newton (*Chabot and Richardson*), 459.
Chattaway (*Della-Nocce*), 460.
Cooper, 463.
Witney, 463.
Pringle, 465.
Hodges, 465.
Wilson, 468.
Aston, 469.
Newton (*Crispin*), 470.
Reeves, 472.
Dodge, 473.
Snider, 476.
Gunner, 477.
Baker, 478.
Burton, 478.
Riley, 480.
Walsh, 480.
Newton (*Berdan*), 481.

BREECH-LOADING SMALL
ARMS—*cont.*

Newton (*Laidley*), 483.
 Rydbeck, 484.
 Richards, 486.
 Russell, 488.
 Russ, Hammond and Ham-
 mond, 487.
 Johnson (*Sharps and*
Dimick), 489.
 Syloen, 490.
 Jackson, 492.
 Burton, 492.
 Wilson, 493.
 Bousfield (*Gray*), 494.
 Stunock, 494.
 Walker, 495.
 Crofts, 497.
 Hunt, 501.
 Pryse and Redman, 501.
 Newton (*Burke*), 502.
 Pape, 505.
 Erskine, 506.
 Bayliss, 507.
 Newton (*Remington*), 507.
 Harvey, 508.
 Cornish, 510.
 Calisher, 511.
 Richards, 513.
 Stokes and Faulkner, 514.
 Wilson, 515.
 Craig, 517.
 Newton (*Bergen*), 518.
 Tranter, 518.
 Darby, 520.
 Isherwood and Warry, 520.
 Main (*Howard*), 521.
 Newton (*Vail*), 522.
 Brooks, 522.
 Barber and Barber, 523.
 Newton (*Jenks*), 528.
 Albini and Braendlin, 527.
 Russ, Hammond and Ham-
 mond, 527.
 Leetch, 528.
 Fosbery, 529.
 Brooman (*Chassepot*), 530.
 Harlow, 530.
 Carler and Edwards, 532.
 Wilson, 533.
 Poppenburgh, 534.
 Syme, 535.
 Wyley, 535.
 Albini and Braendlin, 536.
 Mennons (*Galard*), 537.
 Restell, 538.
 Wilson, 540.
 Robertson, 540.
 Daw and Parsons, 541.
 Lewis, 542.
 Matthews, 542.
 Hunt, 542.
 Clark (*Pidault Lagreze and*
Gevelot), 543.
 Tongue (*Amster-Laffon*), 544.
 Hodge, 544.
 Webley, 544.

BREECH-LOADING SMALL
ARMS—*cont.*

Richards, 547.
 Dines, 547.
 Warmington, 548.
 Newton (*Berdan*), 548.
 Kirkwood, 550.
 Weber, 550.
 Mappin, 551.
 Wood, 551.
 Macintosh, 552.
 Hayman (*Gillon*), 552.
 Martin (*Oelkers and*
Spengler), 552.
 Benson and Poppenburg, 553.
 Cooper, 554.
 Manceaux, 555.
 Henry, 555.
 Pocock, 556.

BULLET-MAKING MACHINES:

Newton, 27.
 Newton (*Allen*), 45.
 Bentley and Sillem, 63.
 Chatterton, 71.
 Bollet, 72.
 Nuthall, 82.
 Newton (*Gornall and*
Hooper), 146.
 Napier, 225.

BULLETS. *See also* Projectiles.

Jansen, 207.
 (Expanding) Newton
 (*Williams and Field*), 234.
 (Chipping cartridge) New-
 ton (*Hook*), 290.
 (Chipping cartridge) Eley,
 305.
 (Chipping cartridge) Bous-
 field (*Hook*), 316.

BULLETS, USE OF TWO:

Sponce (*Shaler*), 212.

BUTTS. *See also* Shield.

Nightingale, 179.

CAPS (PERCUSSION):

(Waterproof) Pursall, 14.
 (Waterproof) Walker and
 Walker, 32.
 (Machinery) Canouil, 66.
 (Machinery) Canouil, 98.
 (Holder for) Richards, 108.
 (Case for) Solter, 191.
 (Holder) Seeley, Wells and
 Phillips, 192.
 Key, 338.
 (Holder) Clifton, Meyers
 and Hoffnung, 418.
 (Holder) Della-Noce, 431.

CARTRIDGES:

Morse, 2.
 (Metallic) Newton, 2.
 Hall, 5.

CARTRIDGES—*cont.*

Brown, 18.
 Birchley, 20.
 (India-rubber) Lavater, 22.
 Ramsar and Scott, 24.
 Peterson, 28.
 Manceaux and Vieillard, 29.
 Sharps, 30.
 (India-rubber) Newton
 (Smith), 34.
 (Compound) Smith, 41.
 (Wire) Brooman (Cochran),
 42.
 Keiller, 43.
 Newton (Henderson), 45.
 Whitworth, 67.
 (Shot) Kerr, 60.
 Newton (Perrin and Del-
 mas), 62.
 (Accelerating) Brooman
 (Cochran), 67.
 Preston and Garrett, 69.
 Hall, 70.
 Macintosh, 71.
 Adams, 77.
 Palliser, 88.
 Fitzgerald and Bate, 97.
 Onard, 99.
 Wilson, 103.
 Richards, 108.
 Wilson, 109.
 (Accelerating) Dana, 118.
 Mathew, 187.
 (Accelerating) Thannon,
 189.
 Newton (Potter and Pome-
 roy), 212.
 Waller, 212.
 Brownlow, 213.
 Needham, 231.
 Fleming, 235.
 Newton (Starr), 235.
 (Metallic) Kellog, 241.
 Moore, 247.
 (Compartment) Haseltine
 (Bailey), 264.
 Walsh, 270.
 Richards, 279.
 Hughes (Mayer), 283.
 Bonneville (Marcet), 291.
 (Blasting) Cunnack, 298.
 Newton (Hook), 299.
 Newton (Alger), 300.
 Eley, 305.
 Fustnot, 312.
 Bousfield (Hook), 316.
 Wilson, 322.
 Cunack, 339.
 Davies (Morgenstern and
 Jenks), 366.
 Greener, 380.
 Davies, 387.
 Richards, 388.
 Newton and Shepard, 391.
 Rydbeck, 392.
 Leetch, 396.
 Reeves, 397.
 Wilson, 399.

CARTRIDGES—*cont.*

Clarke (Berdan), 400.
 Sutherland, 401.
 Poppenburgh, 416.
 Thompson (Sneider), 417.
 Lancaster, 418.
 Braendlin, 421.
 Brooman (Maynard), 421.
 Poppenburgh, 425.
 Mayall, 427.
 (Gun cotton) Revy, 433.
 Cooper, 433.
 Lafont, 434.
 Brooman (Rochaz), 435.
 Wilson, 436.
 Tranter, 443.
 La Penotière, 443.
 Robertson, 444.
 Brown, 448.
 Prince, 451.
 Newton (Berdan), 452.
 Brown, 453.
 Lindner, 454.
 Jones and Jones, 455.
 Felwyn, 456.
 Scott, 459.
 Mullar, 462.
 Witney, 463.
 Wilson, 468.
 Eley, 468.
 Newton (Huse), 472.
 Reeves, 475.
 Boxer, 475.
 Lake (Laidley), 480.
 Walsh, 480.
 Newton (Berdan), 481.
 (Pin) Clark (Gevelot), 483.
 Richards, 486.
 Restell, 486.
 Dixon, 491.
 Wilson, 493.
 Fosbery, 502.
 Wilson, 515.
 Abraham, 519.
 Isherwood and Warry, 520.
 Whitworth, 521.
 Brooks, 522.
 Poppenburgh, 534.
 Clark, 534.
 Boxer, 536.
 Mennons, 537.
 Restell, 538.
 Lake (Powers), 539.
 Wilson, 540.
 Daw and Parsons, 541.
 Wilson, 546.
 Richards, 547.
 Rollason, 549.
 Mappin, 551.
 Manceaux, 555.

CARTRIDGES, MACHINE FOR
 CHARGING. *See also* Car-
 tridges.

Lancaster, 6.
 Hughes (Mennig) 64.
 Lancaster, 71.

EXTRACTOR FOR REMOVING SPENT CARTRIDGES— cont.

Dodge, 473.
Lake (*Mason*), 477.
Baker, 478.
Burton, 478.
Riley, 480.
Newton (*Berdan*), 481.
(Revolver) Cohn, 484.
Richards, 496.
Harvey, 486.
Restell, 496.
Johnson (*Sharps and Dim-
mick*), 480.
Jackson, 492.
Burton, 492.
Wilson, 493.
Bousfield (*Gray*), 494.
Sturrock, 494.
Walker, 495.
Bonnevill (*Plummer*), 497.
Cross, 500.
Cole and Melland, 500.
Hunt, 501.
Pryse and Redman, 501.
Fosbery, 502.
Hume, 503.
Woodward and Fallows, 504.
Newton (*Remington*), 507.
Saville, 508.
Harvey, 508.
Cornish, 510.
Adams, 513.
Newton (*Bergen*), 518.
Tranter, 518.
Main, 521.
Turner and Siddons, 526.
Russ, Hammond and Ham-
mond, 527.
Reeves, 528.
Leetch, 528.
Fosbery, 529.
Brooman (*Chassepot*), 530.
Harlow, 530.
Carter and Edwards, 532.
Wilson, 533.
Poppenburgh, 534.
Syme, 535.
Wyley, 535.
Albini and Braendlin, 536.
Restell, 538.
Hunt, 543.
Hodges, 544.
Dines, 547.
Newton (*Berdan*), 548.
Benson and Poppenburg, 553.
Henry, 555.
Pocock, 556.

FLASKS, POUCHES, &C.:

Haycraft, 173.
Haycraft, 268.
Hawkeley and Bissell, 274.
Lomas, 274.

FLASKS, POUCHES, &C.—cont.

Hutchinson, 310.
Pigou, 351.

FORGING BARRELS. Also Roll- ing.

Cowper, (*Patin, Gaudet and
Co.*), 560 (*Appendix*).
(Compound bars) Rose, 14.
(Taper) Burton, 40.
Clay, 72.
Clay, 89.
Baker, 104.
Duclos, 105.
Blake, 110.
Prodon, Bonneton, and
Prodon, 190.
(Ordnance) Thomas, 190.
Hughes, 196.
Haseltine (*Hitchcock*), 254.
Brown and Brown, 255.
Christoph and Hawksworth,
260.
Vickers, 262.
Whitworth and Hulse, 266.
Faulkner and Faulkner, 268.
Thompson, 278.
Thompson, 352.
Ames, 406.
Marshall and Mills, 409.
Johnson (*Jones*), 411.
Claridge, 467.
Rickett, 471.

FULMINATING POWDER. See also Caps, Primers, Ex- plosive Compounds.

Canoull, 98.

FURNACE FOR HEATING

SHOT:

Sievier, 181.

FURNITURE FOR GUNS, ALLOY

FOR:

Edmunds, 298.

FUSE:

(Percussion) Armstrong, 33.
Armstrong, 189.
Johnson (*Hotchkiss*), 237.
Newton (*Tice*), 276.
Bickford and Smith, 285.
Boxer, 318.
Clark (*Eckel*), 325.
Noble, 326.
Newton (*Voruz*), 337.
Newton (*Walton*), 384.
Lancaster, 399.
Bickford, 427.
Blackie, 431.
Haseltine (*Hotchkiss*), 439.
Haseltine (*Schenkt*), 440.
Noble, 445.
McInty, 506.
(Blasting) Rollason, 540.

GASES, FOR PROPULSION :

Henry (*Cohade*), 34.
Meekins, 204.
Evans, 347.

GAS-TIGHT JOINT. See also

Breech-loading.

Harding, 107.
Parsons, 111.
Storm, 131.
Storm, 141.
(Cup for cannon) Armstrong, 150.
Parsons, 150.
Bailey, 153.
Cooper, 153.
Manceaux, 165.
Brooman (*Broadwell*), 170.
Curtis, 182.
Brooman (*White*), 190.
Marsh, 199.
Richards, 234.
Bousfield (*Hartshorn*), 271.
Pryse and Kirkwood, 275.
Braendlin, 301.
Snider, 301.
Dougall, 309.
Snider, 327.
Byrnes and Benjamin, 328.
Burr, 333.
Newton (*Crispin*), 470.
Wilson, 488.
Brooman (*Chassepot*), 530.
Matthews, 542.

**GRINDING MACHINES FOR
SWORD BLADES :**

Brooks, 154.

GUARD. See also Locks.

(Casting) Hollis, 159.

GUN AND LANCE :

Hely, 178.
Newton (*Campbell*), 277.

**GUN BOAT. See also Under-
water Guns.**

Napier, 339.
Greene, 423.

**GUN CARRIAGES. See also
Platform.**

Mann, 557 (*Appendix*).
Peppercorn, 557 (*Appendix*).
Lee, 558 (*Appendix*).
Chinnock, 559 (*Appendix*).
Roberts, 560 (*Appendix*).
Whitworth, 21.
Tjader, 23.
Brooman (*Rockus*), 39.
Newton (*Brown*), 100.
Hale, 107.

GUN CARRIAGES—cont.

Braynard, 110.
Jones (*Walsh*), 119.
Sidebottom, 137.
Lambert, 169.
Hayes, 184.
(Elevating) Winans, 200.
Roche, 219.
(Balanced) Leigh, 225.
(Working) Cunningham, 252.
Newton (*Judson*), 256.
(Balanced) Johnson (*Ridgeway*), 256.
Reed, 272.
Wiard, 273.
Worms, 280.
Clark, 288.
Richards, 289.
(Balanced) Coles, 289.
Broadhead and Murdoch, 290.
Cunningham, 291.
(Working) Russell, 299.
Napier, 339.
Cunningham, 339.
Clark, 345.
Bousfield (*Judson*), 346.
(Shields for) Brooman (*Blakely*), 358.
Newton (*Eads*), 360.
(Shields for) Mennons, 362.
Blakely, 396.
Newton (*Eads*), 401.
(Self-acting) Moncrieff, 401.
Coles, 402.
(Working) Cunningham, 442.
Wilson, 442.
Cunningham, 445.
Walker, 450.
(Compressed) Rendel, 456.
(Compressed) Newton (*Ericsson*), 461.
Heathorn and Wells, 463.
Mallet, 464.
Cunningham, 474.
Staunton, 476.
Walker, 485.
(Self-acting) Moncrieff, 505.
(Compressor) Vavasseur, 512.
Scott, 520.
Hadden, 527.
Scott, 531.
Grason, 545.

GUN COTTON :

(Cartridge) Macintosh, 106.
Barnwell and Rollason, 121.
Parkes, 339.
(Cartridge) Revy, 433.
Parkes, 466.
Dixon, 491.
Prentice, 495.
Reeves and Murchamp, 549.

ORDNANCE. *See also* Breech-loading Cannon.

Cowper, 529 (*Appendix*).
 Hobbs, 15.
 Armstrong, 24.
 Krantz, 24.
 (Compound) Vassero
 (*Smith*), 25.
 (Built up) Wilson, 35.
 (Shunt) Armstrong, 37.
 (Built up) Fisher, 51.
 Hadden, 51.
 Baker, 104.
 (Breech Jacket) Lancaster,
 Brown and Hughes, 107.
 Simons, 106.
 Richards, 106.
 Parsons, 111.
 Leverton, 127.
 Franc, 134.
 Sidebottom, 137.
 (Compound) Bessemer, 139.
 Burnett, 140.
 (Compound) Sax, 154.
 Bessemer, 158.
 Vallance, 161.
 (Compound) Scott, 163.
 Sidebottom, 170.
 Thomas, 180.
 Lancaster, 204.
 Hadden, 209.
 Sidebottom, 211.
 (Welding sheets) Newton
 (*Yackel*), 223.
 Parsons, 230.
 Parsons, 234.
 Bush, 238.
 (Welding) Haseltine (*Hitch-
 cock*), 254.
 Brown and Brown, 255.
 Palliser, 257.
 Vickers, 262.
 Whitworth and Hulse, 266.
 Richards, 279.
 Blakely, 285.
 (Soldering sheets) Baker,
 287.
 Richards, 289.
 (Double) Smith (*Gregory*),
 305.
 Poynter, 310.
 Hutchinson, 311.
 Parsons, 316.
 (Wire soldered) Nobel, 323.
 Blakely, 333.
 Ash, 330.
 Burr, 333.
 Clarkson, 334.
 Hadden, 335.
 Hutchinson, 337.
 Halo, 341.
 Clarke, 345.
 Kirtage, 347.
 (Hardened hoops) Tread-
 well, 349.
 Parsons, 354.

ORDNANCE—cont.

Sawyer, 358.
 Suiter, 369.
 Parsons, 361.
 Hanning, 367.
 Brooman (*Clarden*), 368.
 Sanderson, 373.
 Prosser, Duke and Clayton,
 383.
 Harding and Thomas, 392.
 Service, 393.
 Johnson (*Jones*), 411.
 Newton (*Ferns*), 453.
 Deakin and Johnson, 460.
 Ames, 474.
 Newton (*Ames*), 485.
 Deakin and Johnson, 494.
 Boyle, 504.
 Hobbs, 508.
 Newton (*Ericsson*), 515.
 Rendel, 517.
 Weldon, 519.

PIN CARTRIDGES. *See also* Cartridges.

Shedden, 82.
 Brooman (*Parent*), 291.
 Pope, 299.

PISTOLS. *See also* Revolvers.
 (Carbine) Newton, 15.
 Deloigne, 226.**PLATFORM FOR ORDNANCE.**
See also Gun Carriages.

(Turntable) Ward, 68.
 (Elevating) Winans, 200.
 (Elevating) Winans, 214.
 (Elevating) Coles, 289.
 (Balanced) Wilson, 313.
 (Elevating) Ingfield, 323.
 Matthew, 324.
 Peniston, 328.
 Radley, 329.
 Napier, 339.
 (Balanced) Walker, 348.
 (Elevating) Luke, 353.
 Newton (*Eads*), 360.
 (Elevating) Walker, 375.
 Walker, 450.
 Walker, 482.

POLISHING SHOT, MACHINE
FOR :

Clarke (*Winsor*), 425.

PORT-HOLE (WATER-TIGHT)
FOR FIRING. *See also* Under-water Guns.

Page, 168.
 Bourne, 171.
 Soul (*Palmer*), 233.

POWDER. *See* Gunpowder.

**PRIMERS. See also Cap Lock,
Self-priming.**

Johnson, 33.
Harmer and Parsons, 48.
Bousfield (*Treadwell*), 269.
Canouil and Blanchon, 511.
Brooman (*Chassepot*), 530.

PROJECTILES FOR CANNON.

Quin, 3.
Hooper, 4.
(Self-rifling) Webster, 12.
(Coated) Norton, 12.
Hobbs, 15.
(Self-rifling) Brown, 18.
(Compound) Rippingille, 19.
(Coated) Whitworth, 21.
Maudslay, 28.
(Shunting) Armstrong, 37.
(Shell) Armstrong, 38.
Brooman (*Rociaz*), 39.
(Coated) Brooman (*Cochran*), 42.
(Compound) Smith, 44.
Whitby and Dempsey, 47.
Kukld, 49.
Newton (*Stoughton*), 60.
Le Jeune, 61.
Smith, 62.
Benson, 62.
Warry, 63.
Brooman (*Cochran*), 67.
(Self-rifling) Chatterton, 71.
Whitworth, 74.
Haddan, 81.
(Self-rifling) Townsend, 84.
Reynolds, 85.
Palliser, 88.
Haddan, 91.
Vandenburgh, 96.
Preston, 101.
Wilson, 103.
Macintosh, 106.
Haddan, 116.
Greenwood, 117.
(Exterior) Grahame, 118.
Burnett, 125.
Preston and Kennedy, 128.
Vandenburgh, 130.
Bessemer, 139.
Storm, 141.
(Self-rifling) Newton (*Burbanks*), 142.
Lawson and Barnes, 143.
Dowry, 147.
Burnett, 149.
Warry, 157.
Bessemer, 158.
Barrett, 160.
(Discs) Woolcombe, 161.
Haddan and Minasi, 175.
Thomas, 177.
Thomas, 187.
Armstrong, 189.
Vetterlin, 192.

**PROJECTILES FOR CANNON—
cont.**

(Discs) Hutchinson, 192.
Haddan, 209.
Sidebottom, 211.
Boucher, 215.
Newton (*Potter*), 216.
Barrett, 220.
(Smooth bore) Lock, 221.
(Smooth bore) Mackay, 221.
(Smooth bore) Mahon, 225.
Whitworth, 234.
Marson, 234.
Johnson (*Hotchkiss*), 237.
Johnson (*Descoutures*), 249.
Loeder, 254.
Palliser, 257.
Palmer, 263.
Richards, 268.
Blakely and Vavasaur, 268.
Horne, 271.
Clarke (*Stafford*), 272.
Blakely, 285.
(Chilled) Palliser, 286.
Clark, 288.
Haddan, 296.
Mackay, 307.
Hennessey, 311.
Marsh, 313.
Blakely, 321.
(Stem) Gardner, 324.
Parsons, 324.
Price, 327.
MacHaffie, 333.
(Rolling) Bessemer, 334.
Whitworth, 336.
Gedge (*Morcan*), 340.
Pigot, 340.
Aisthorpe, 340.
(Malleable iron) Shaw, 342.
Clark, 345.
Caudwell, 345.
(Chilled fronts) Newton
(*Gruson*), 354.
Parsons, 361.
Coughin, 362.
Croft, 365.
(Coating) Britten, 369.
(Compound) Lancaster, 370.
Clark, 378.
Mackay, 380.
Harriss, 385.
Pitts, 388.
Harriss, 388.
Cail, 405.
Clark, 408.
Brandon, 413.
(Polishing) Clark (*Winvor*),
425.
Haseltine (*Hotchkiss*), 439.
Newton (*Lugo*), 452.
Krupp, 459.
Henwood, 461.
Blakely and Vavasaur, 475.
Evelyn, 484.
Brooman (*Cochran*), 490.

RIFLE GROOVES OR BORE—
cont.

Parson, 356.
Wilks, 367.
Spence (*Siepel*), 434.
Ellis, 462.
Metford, 454.
Jones, 462.
Newton (*Berdan*), 481.

ROCKETS :

Hale, 23.
Hewetson, 81.
Morgan, 99.
Hale, 109.
Hewetson, 116.
Fletcher and Forrest, 321.
Boxer, 362.
Roya and Lilliendahl, 419.
Hale, 429.

ROCKET TUBES :

Balchin, 29.
(Guns) Walker (*Roya*), 41.
Hewetson, 81.
Walker (*Roya*), 145.
Fletcher, 321.
Roya, 419.

SABOT. See also Projectiles,
Wads.

Davies (*Bice*), 119.
Schenkl, 155.
Thomas, 177.
Girdlestone, 203.
Girdlestone, 229.
(Rifling) Newton (*Day, Ritter, and Bird*), 245.
Richards, 301.
Mackay, 307.
Bryant, 327.
Williams, 457.
Dana, 471.

SAFETY LOCK. See also Locks.

Shaw, 6.
Bestell, 7.
Luis, 13.
Beasley, 16.
Bippingille, 19.
Sharps, 30.
Brown and Milne, 35.
Atkinson, 58.
Hollis, 114.
Culling, 204.
Savage, 210.
Waller, 212.
Culling, 214.
Green and Green, 241.
Culling, 246.
Fonpainemoreau (*Fleury*), 345.
Arnold, 424.
Norris, 466.

SALOON FIRE-ARMS :

Farncombe, 18.
Unwin, Unwin, and Ash-
ham, 129.
Newton (*Stevens and Nor-*
ton), 135.
Ganne, 287.
Canouil and Blanchon, 309.

SCABBARDS. See also India
Rubber, Gutta Percha.

Middleton, 1.
Clark (*Jay*), 83.
Desborough and Middleton,
133.
(Swivel) Gill, 152.
Field, 295.

SELF-LOADING ARMS. See also
Locks.

(Repeating) Squares, 5.
Pilon, 13.
Bailey, 26.
Harding, 72.
(Repeating) De Nevers, 112.
Bentley and Bentley, 117.
(Repeating) Newton
(*McCord, Cox, and Wood-*
ward), 145.
(Spencer) Newton (*Spen-*
cer), 151.
(Repeating) Newton
(*McCord*), 177.
Nugent, 197.
Mennons, 211.
Horton, 244.
(Repeating) Brooman (*Ra-*
fael), 246.
Mouin, 256.
Tronchon, 263.
Clark (*Winchester*), 282.
Kennedy, 322.
Snell, 336.
Bousfield (*Fitzgerald*), 407.
Eldredge, 419.
Gatling, 423.
Tronchon, 423.
Samsen, 464.
Clark (*Winchester*), 471.
Henry (*Jarre*), 485.
Curtis, 509.
Hughes (*Winchester*), 526.

SELF-PRIMING ACTION. See
also Locks.

Chester, 15.
Prince, 31.
Johnson (*Bell, W. H.*), 33.
Johnson (*Bell, F.*), 39.
Harmer and Parsons, 48.
Smith, 50.
Harding, 72.
Hulett and Boecius, 74.
FitzGerald and Bate, 97.

SELF-PRIMING ACTION—cont.

Prince, 105.
Wylie, 180.
Chattaway, 460.
Canouil and Blanchon, 511.
Callisher, 511.

SHELLS. See also Projectiles.

Armstrong, 38.
Kukla, 46.
(Compound) Ambler, 54.
Brooman (*Cochran*), 67.
Macintosh, 71.
(Incendiary) Haddon, 81.
(Percussion) Clarke (*Forbes and Challeton*), 98.
Davies (*Minie*), 119.
Howe (*Cochran*), 128.
Sax, 154.
Sillem, 161.
Armstrong, 189.
MacIntyre, 195.
Whitworth, 234.
Johnson (*Hotchkiss*), 237.
Johnson (*Eastbrook*), 252.
Loeder, 254.
Palmer, 258.
(Incendiary) Norton, 276.
Newton (*Tice*), 276.
Boxer, 318.
(Shrapnel) Boxer, 362.
Cotter, 407.
(Rocket) Roys and Lillien-
dahl, 419.
(Small arms) Metford, 454.
McEvoy, 470.
Alderson, 490.
McEvoy, 506.
Noble, 511.
Williams, 516.

SHELLS, MACHINERY FOR MAKING :

(Shaping) Whitworth, 74.
(Polishing) Clark (*Winsor*), 425.

SHIELDS OR MANTLETS :

(Ships) Roberts, 580 (*App.*).
(Ships) Shaw, 25.
Price, 123.
Nightingale, 179.
Nightingale, 216.
Hill, 241.
Hill, 270.
(Ships) Walker, 375.
Johnson, 431.
(Ships) Scott, 530.
Williams, 538.

SMALL SHOT :

(Iron) Biddell, 184.

SHOT BELTS, POUCHES, &c

Prater, 93.
Bourke, 240.
Bartram, 412.

SIFTING MACHINERY :

Smith, 7.

SIGHTS FOR GUNS :

Maynard, 38.
Ashby, 47.
Walton, 78.
Haddan, 89.
Doublet, 111.
(Telescopic) Vallance, 113.
Clarke (*Minie*), 119.
(Measuring) Richardson, 120.
Golden, 122.
Jones, 123.
Keble, 131.
Jacques, 132.
Lancaster, 132.
(Spectacles) Braham, 143.
(Measuring) Carter, 143.
(Measuring) Corke, 153.
Henry, 156.
(Measuring) Browning, 159.
Coles, 166.
Robertson, 171.
Webley and Webley, 174.
Richards, 174.
Whitworth and Hulse, 175.
Fry, 178.
Wylie, 180.
Walker, 181.
(Measuring) Corke, 183.
Blozam, 186.
Baylis, 186.
Matthew, 187.
Purchase, 191.
Newton, 199.
(Measuring) Smith, 210.
Brownlow, 213.
Beaumont and Edge, 213.
Richards, 264.
Price, 267.
Cooper, 282.
Holborow and Parker, 292.
Browne (*Brighton*), 307.
Goodwin, 351.
Parsons, 361.
Wylie and Grainger, 364.
(Measuring) Wickham, 366.
Lyme, 366.
Cope, 369.
Bissell, 436.

SIGNALS :

(Lights for) Johnson (*Ogier*), 55.
(Target) Keller, 181.
(Target) Crosswaithe and Arman, 184.
(Target) Harris, 199.

SIGNALS—*cont.*

(Target) Bland, 227.
 Ronald, 229.
 Brierley and Smeaton, 231.
 Staunton, 233.
 Nethersole and Backland,
 239.
 (Target) Perrin, 233.
 Hart, 331.
 Bland, 331.

SKELPS. *See also* Forging.

Perry, 148.

SPONGE FOR GREAT GUNS :

Mart, 83.
 (Lubricating) Brown, 158.

STEEL BARRELS. *See also* Barrels.

(Compressed) Wilson, 129.
 (Compressed) Rowan, 222.

STOCKS FOR SMALL ARMS :

(Gutta percha, &c.) Brocke-
 don and Hancock, 558
 (*Appendix*).
 (Wrought iron) Manceaux,
 11.
 (Gutta percha) Cowper, 20.
 Evelyn, 22.
 Smith, 59.
 Johnson (*Lefaucheur*), 83.
 Hollis, 114.
 Clark (*Minié*), 119.
 Smith, 125.
 Henry, 156.
 Newton (*Alsop, Alsop, and*
Chauncey), 167.
 (Adjusting) Haddon, and
 Minasi, 180.
 Haddon, 209.
 Minasi, 209.
 (Metal) Turner, 237.
 Manceaux, 272.
 Lyne, 366.
 Jones, 462.

STOCKS, MACHINE FOR MAKING :

Stokes, James and Stokes,
 238.

**STOPPER FOR GUNS. *See* Tom-
pion.****STRIKER FOR LOCK OF
BREECH-LOADER. *See also*
Locks.**

Sharps, 30.
 Hammond, 30.
 Clark (*Canalon*), 274.
 Stafford, 237.
 Bonneville (*Marcet*), 291.

**STRIKER FOR LOCK
BREECH-LOADER—*cont.***

Wilson, 375.
 Richards, 388.
 Eydebeck, 392.
 Snider, 397.
 Reeves, 398.
 Poppenburgh, 416.
 Braendlin, 421.
 Henry, 423.
 Carle, 430.
 Carr, 430.
 Wilson, 436.
 Bissell, 436.
 Lancaster, A., 438.
 Haseltine (*Day*), 438.
 Cooper, 439.
 Newton (*Jardinier*), 441.
 Webley, 446.
 Law and Law, 447.
 Soper, 448.
 Lindner, 454.
 Needham and Needham,
 456.
 Gray, 458.
 Newton (*Chabot as*
Richardson), 459.
 Pringle, 465.
 Reeves, 472.
 Riley, 480.
 Richards, 486.
 Harvey, 486.
 Restell, 486.
 Johnson (*Sharps and I*
nick), 489.
 Sylvén, 490.
 Burton, 492.
 Hunt, 501.
 Saville, 508.
 Harvey, 508.
 Richards, 513.
 Wilson, 515.
 Tranter, 518.
 Isherwood and Warry, 52.
 Brooman (*Chassepot*), 53.
 Albini and Braendlin, 53.
 Robertson, 540.
 Matthews, 542.
 Clark (*Ridani, Lagre*
and Gevelot), 543.
 Dines, 547.
 Newton (*Berdan*), 548.
 Cooper, 554.
 Henry, 555.
 Pocock, 556.

SUBMARINE BOAT :

Merriam, 487.

SWORD, SWORD BLADES :

(Rolling) Johnson (*Vin*),
 (Zinc coat) Mole and M
 118.
 Brooman (*Manceaux*), 1.
 (Rolling) Davies (*Nad*
 137.

SWORD, SWORD BLADES—
cont.

(Dagger) Smith, 583 (*App.*).
(Rolling) Barber and De
Garrs, 583 (*Appendix*).
Watts, 271.

SWORD AND DAGGER-HILTS :

(Gutta percha, &c.) Brocke-
don and Hancock, 558
(*Appendix*).
Russell, 35.
Cooper, 52.
Smith, 73.
Ghislin, 127.
Ghislin, 151.
Burnand, 178.
Ghislin, 564 (*Appendix*).
Watts, 277.
Ghislin, 565 (*Appendix*).

SWIVEL FOR GUNS :

Gilbert, Gilbert and Had-
don, 198.

TARGETS :

Treeby, 55.
(Electric) Lang and Cheva-
lier, 86.
Price, 124.
Hemming, 137.
(Electric) Gisborne, 157.
McNeille, 160.
Gisborne, 161.
(Practice) Haddon and
Minasi, 180.
Crosthwaite and Arman, 184.
Harris, 199.
Pritchett, 208.
Gisborne, 220.
Porter, 239.
Hill, 241.
(Brush for) Fyfe, 282.
Bland, 329.
Hart, 331.
Bland, 331.
(Electric) Gisborne, 382.
Wethered, 489.
Soper, 498.
Hall, 505.
Cusack, 551.

TELESCOPE SIGHT. See also
Sights for Guns.

Walton, 78.
Vallance, 113.
Davidson, 262.

TENT :

Bennet, 9.
Davies, 10.

TESTING APPARATUS FOR
GUNPOWDER :

Thomas, 10.

TOMPION STOPPERS FOR
GUNS :

Jennings, 141.
Bolton, 206.
Brindley, 226.
Bossard, 240.
Maschwitz, 284.
Thompson, 302.
Thompson, 331.
Thompson, 344.
Thompson, 385.
Thompson, 405.
Crowe, 424.
Newton (*Wilmot*), 457.
Thompson, 474.

TOUCH-HOLE. See also Locks.

(Compound) Vasserot, 25.
(Stopper for) Le Mat, 52.
(Central) Haddon, 133.
Vallance, 161.
Hutchinson, 337.

TRIGGER. See also Locks.

(Hair) Hunt, 114.
(Steel) Paris, 123.
Halliday, 136.
(Steel) Paris, 144.
(Guard) Hollis, 159.
Christofleau, 276.
Caise, 505.

UNDER-WATER GUNS :

Page, 163.
Bourne, 171.
Sievier, 181.
Siemens, 188.
Burley, 227.
Beley, 275.
Coles, 289.
Hughes, 336.
Longridge, 479.
Lungley, 553.

VENT. See Nipple, Touch-
hole.

(Cover for) Le Mat, 52.

WADS. See also Sabot.

Church and Lewis, 559 (*Ap-
pendix*).
(Lubricating) Whitworth,
21.
(Rifling) Brooman (*Coch-
ran*), 42.
(Lubricating) Lundy, 47.
(Rifling) Jeffery, 48.
Haddon, 55.
Manceaux, 57.
Bielefeld, 88.
Richards, 108.
Davies (*Rice*), 119.

WADS—cont.

Scott, 189.
 Scott, 198.
 Davis and Cate, 314.
 Rigby, 341.
 (Lubricating) Dervault, 379.
 (Machine for) Davis, Cate
 and Cate, 390.
 (Mechanically fitting) Whit-
 worth, 461.

WASHING GUN BARRELS :

(Flexible tube) Wilson, 75.
 Nevill and Bark, 80.

**WASHING GUN BARRELS—
cont.**

(Flexible tube) Henry, 81.
 Walker, 181.

**WATERPROOF CLOTHING
KNAPSACKS, &c.:**

Brockedon and Hancock,
 558 (*Appendix*).
 Isaac, 75.
 Stenhouse, 197.
 Yvose-Laurent, 344.
 Yvose-Laurent, 373.

WIRE FOR EPAULETTES:

Romper, 259.

ERRATA.

Since the publication of the first volume of the present series of Abridgments the following errata have been discovered therein ;—

- Page 23, line 13 from bottom, *for* "Weyms" *read* "Wemis."
Page 30, line 15 from top, *for* "Beyer" *read* "Berger."
Page 37, line 16 from top, *for* "No. 2354" *read* "No. 2454."
Page 53, line 16 from bottom, *for* "No. 2755" *read* "No. 3755."
Page 54, line 10 from top, *for* "No. 5773" *read* "No. 3773."
Page 57, line 13 from top, *for* "A.D. 1885" *read* "A.D. 1815."
Page 57, line 14 from top, *for* "Harris" *read* "Harries."
Page 64, line 17 from top, *for* "David" *read* "Davis."
Page 92, line 16 from bottom, *for* "No. 2129" *read* "No. 9129."
Page 115, line 9 from top, *for* "Howels" *read* "Howells."
Page 198, line 6 from top, *for* "Higginson" *read* "Higgins."
Page 198, line 7 from bottom, *for* "Laurie" *read* "Lawrie."
Page 199, line 19 from bottom, *for* "Bursell" *read* "Bursill."
Page 213, line 2 from top, *for* "Frapeleg" *read* "Crapelet."
Page 230, line 12 from top, *for* "No. 185" *read* "No. 1857."
Page 247, line 12 from top, *for* "No. 21" *read* "No. 24."
Page 260, line 2 from top, *for* "Austin" *read* "Austen."
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32. HYDRAULICS, vol-
15, 102

33. RAIL

33. RAY

84 MAY

35. F

30.

87

CONTENTS.

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to use the kilnes for the drying of malt, &c. &c. (Letters Patent)

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